THE IRON AGE

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See page 60

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SEE PAGE 29

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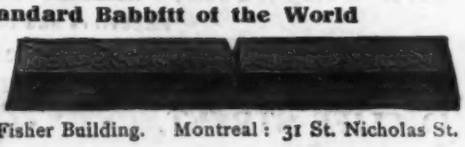
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THE IRON AGE

New York, Thursday, October 1, 1908.

The New Universal Boring Machine.

The universal boring, milling and drilling machine illustrated in Fig. 1 is the new type which has just been brought out by the Universal Boring Machine Company, Hudson, Mass. The machine is of the class that has the head at the right end of the bed, the idea being that boring and milling are more conveniently accomplished by this arrangement. It is known as the No. 1 machine, and takes 54 in. (and with the extension bed 94 in.) between the face of the spindle and the outboard bearing support.

The bed of the machine is of box pattern, and upon it the carriage with its table has horizontal movement. The table is 20 x 42 in., but larger work may be held by using the auxiliary table. The head is arranged to move vertically in unison with the outboard bearing which supports the outer end of the boring bar. The total vertical travel of the head is 24¾ in. The spindle has an all-geared drive from a constant speed shaft, with 16 changes of speed in the speed box and head, running from 15 to 200 rev. per min. There are feeds in all directions, comprising longitudinal carriage feed, cross table feed, vertical feed of the head and longitudinal feed of the boring bar. The feeds are independent of the spindle speed, and range from ¾ to 5½ in. per minute. By operating the boring bar feed and the carriage at the same time and in opposite directions, it is possible to get a maximum feed of the tool into the work of 11 in. per minute. The feed box gives nine feeds, which multiplied by the 16 speeds of the spindle gives a total of 144 different feeds per spindle revolution, varying from 0.006 to 0.34 in.

The control of the machine is all shown in Fig. 2. As designated by the reference letters, A is the belt shifter by means of which the machine, as a whole, is started and stopped; B and C the handles, controlling the changes of speed, which changes are doubled by the fast and slow speed lever D; E and F the handles controlling the feed changes; G the lever controlling the power raising and lowering of the head; H the table and

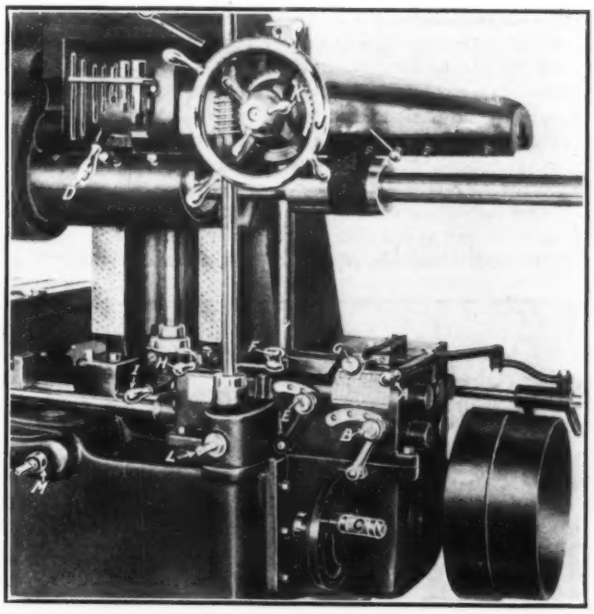

Fig. 2.—Detail at the Head, Showing the Controlling Means.

bar feed lever; I the lever through which all feeds are reversed; J the handwheel for quick hand feed of the boring bar; K the handwheel for engaging and disengaging the power feed of the boring bar; L the crank hold for fine hand feed of the boring bar and hand elevating of the head, and M the crank hold for carriage hand feed.

The speed box shown open in Fig. 3 is an interesting one. It occupies the lower part of the box at the head of the machine, the upper section being used for the change feed mechanism. By the use of nine gears and a segment gear, Fig. 4, having two studs, one above and one below its pivoting point, and a rocker gear operated by

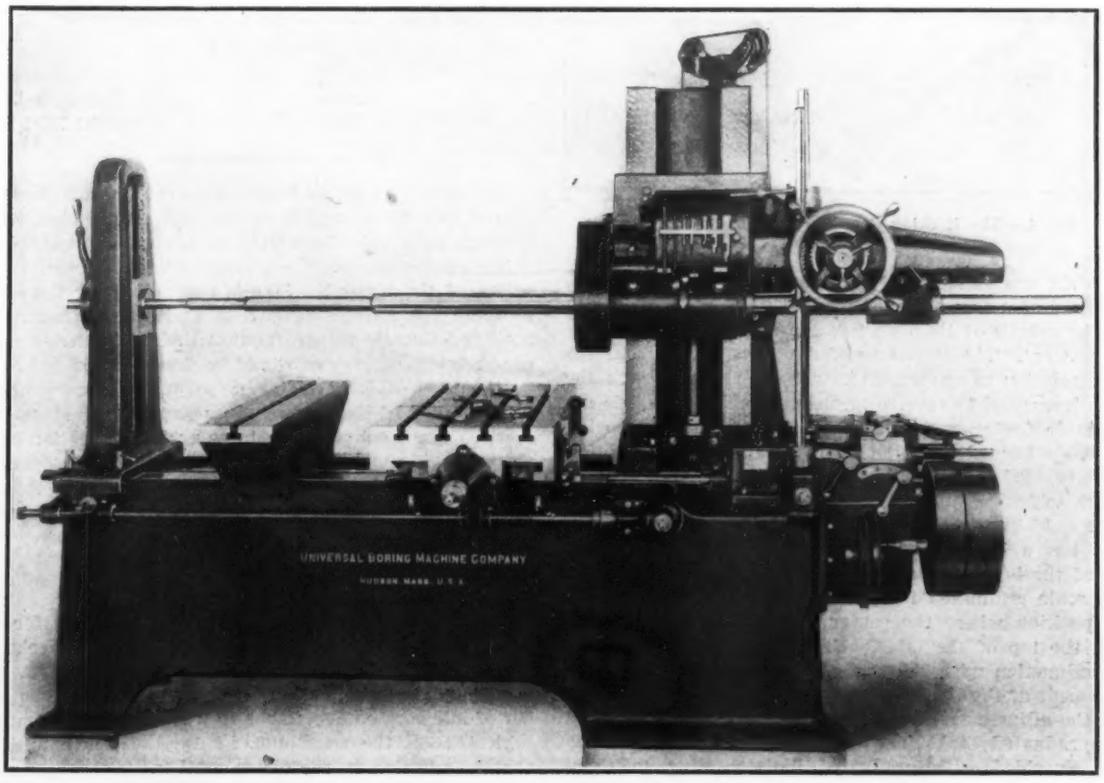

Fig. 1.—The New Universal Boring, Milling and Drilling Machine.

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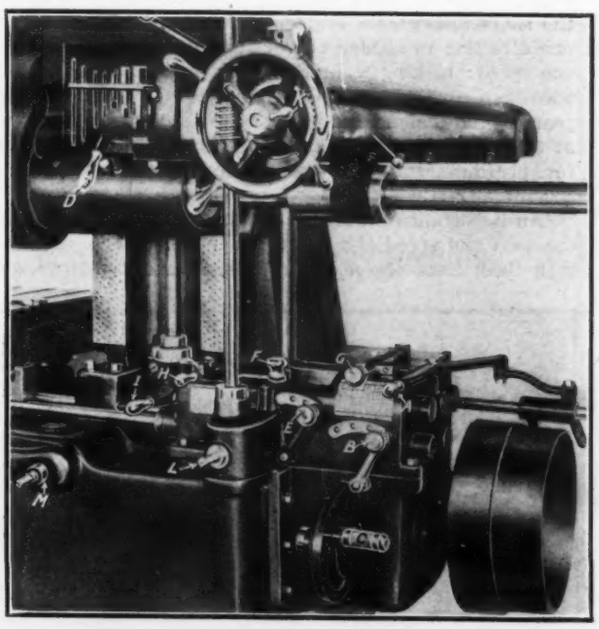

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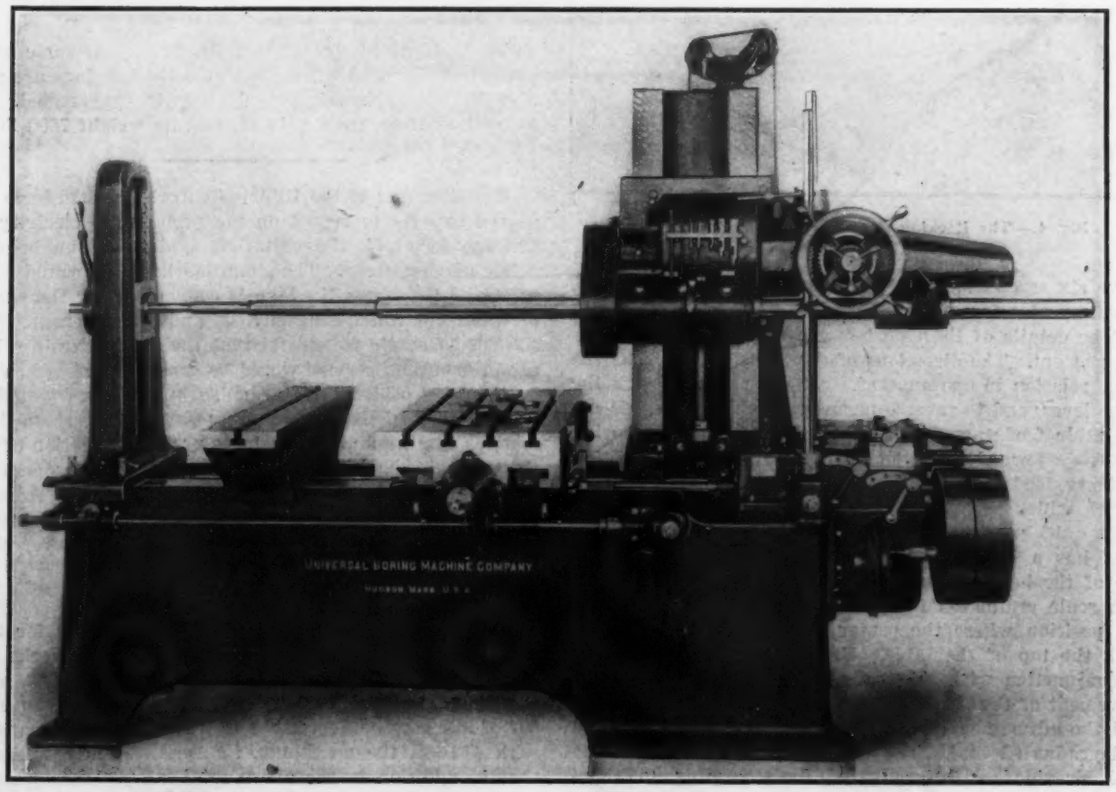


Fig. 1.—The New Universal Boring, Milling and Drilling Machine.

a hand lever, eight speeds are obtained. The cone of four gears keyed together slide on the constant speed shaft. A gear running loose on the upper stud of the segment gear meshes the smaller of two gears that are keyed on the shaft through the center of the segment. Two gears, keyed together, are mounted on the lower stud of the segment, one of these meshing with the larger gear on the shaft through the segment. Rocking the segment in one direction to engage one of the four cone gears gives one speed; rocking it in the other gives another speed. Two speeds are similarly obtained for each of the other gears of the cone, making eight speeds which are doubled at the head, giving a total of 16, ranging from 15 to 200 rev. per min., with the constant speed shaft running at 230 rev. per min.

An important convenience lies in the manner in which the feed and speed boxes are fastened together. To detach them from the machine it is necessary only to remove six screws and pull out the speed and feed shafts, a matter of a few minutes' work.

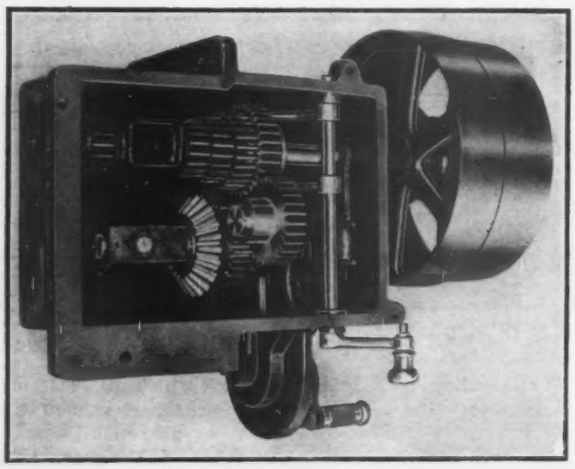


Fig. 3.—The Speed Box Opened.

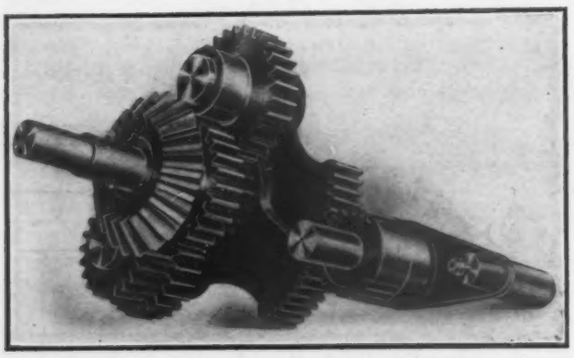


Fig. 4.—The Rocking Gear Part of the Speed Box.

The details of the feed box are not yet ready for announcement. The directions of the feeds always bear the same relation to one another. All are reversed with the same lever, and to reverse means that the head feeds up, the table feeds away from the operator and the boring bar feeds toward the outer bearing support. In addition to these feeds the head has also one fast up-and-down travel, which permits the boring bar to be brought to a point quickly without the use of the hand crank. The head has a hand adjustment with graduated dial. On one of the bearing surfaces upon which the head moves is a scale graduated in inches; the zero corresponds to the position where the center of the spindle is in line with the top of the table. Using the quick power feed in conjunction with this scale, it is possible to stop the movement of the head within ⅛ in. of the point required, and the adjustment is completed by using the hand feed and graduated dial. The table, carriage and head are each provided with graduated dials reading to thousandths of an inch.

The power feed for the carriage, already mentioned, is an interesting detail of the machine. Beneath the carriage are three gears supported by a bracket. One gear is on the table feed shaft, another on the carriage feed screw, while the third is a pull gear on a stud between them. The removal of this gear provides the means of quickly disconnecting the power feed from the carriage. Any feed of the boring bar may be doubled by the use of this mechanism, which is designed especially for use in drilling. A pin is screwed in the bed below the bracket to take the pull gear when it is not in use. The boring bar is able to feed 27 in., and can be reset by a clamp bearing so that 55 in. of travel can be obtained. The hand wheel is set at a point most convenient for the operating and setting of the boring bar, permitting the operator to be close to his work and within easy reach of the feed friction or hand wheel. The alignment of the outboard bearing for the boring bar with the head is maintained by a connection between the elevating screws of each through spiral gears and a shaft within the bed.

The table has a feed of 30 in. with automatic stops. The vertical power travel of the head is 22¾ in., with the possibility of 24¾ in. when fed by hand. With the extension bed the machine giving 94 in. between the face of the spindle and the outboard bearing support, two bars are used, the regulation bar and one 124 in. long. They are easily exchanged. The driving shaft carries tight and loose pulleys. The loose pulley is slightly smaller in diameter than the tight pulley to relieve strain on the belt and is cast with a receptical in its hub, which is filled with cotton waste and oil from which wicking runs to the bearing, insuring lubrication for indefinite periods.

Care has been taken in gibbing the head, the ratio of length to width of which is 6 to 1. Besides this gibbing, at one edge of the head post a square lock gib is used to take up any wear at a point nearest the work. A gib of 90 degrees is employed to provide for wear at this head side, the form of gib permitting it to fit properly on the angular bearing of the head post.

The head being at the right end of the machine, boring and milling is done without the necessity of reversing the motion of the spindle, and permitting the operator to watch and operate the machine conveniently. The driving of the spindle is at a point nearest the work, a feature of special advantage in securing stiffness in large milling cutters. On the face of the spindle provision is made to bolt or fasten cutters such as are usually used in heavy milling machines.

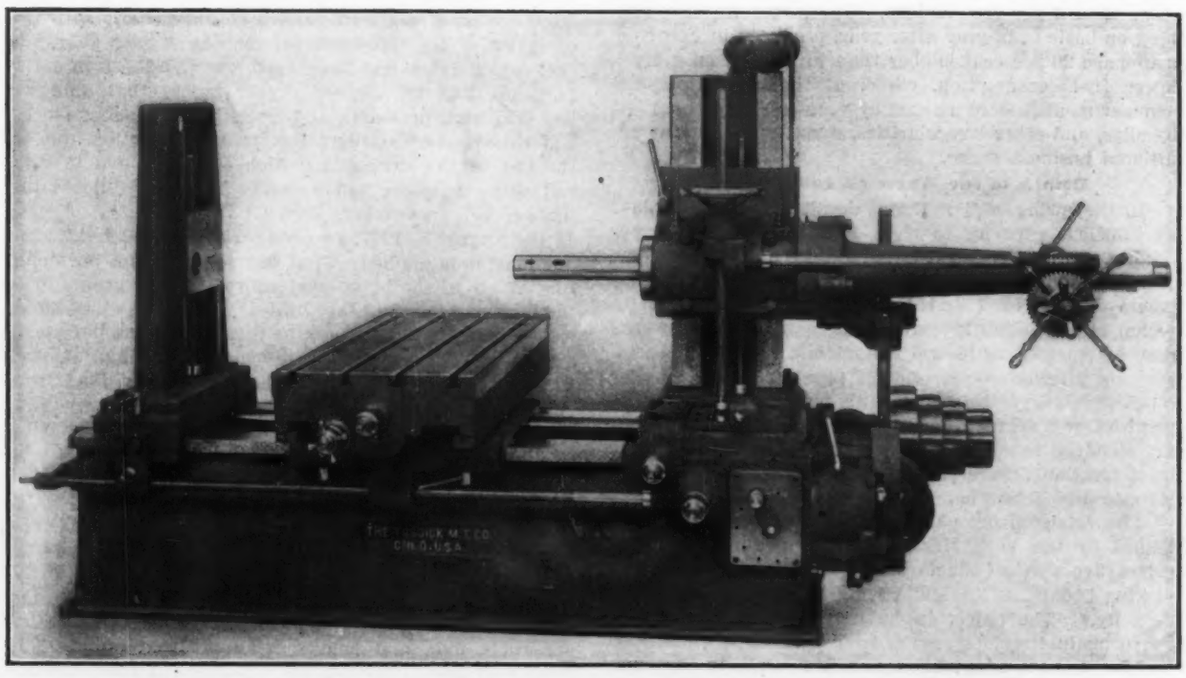
Particular attention has been given in the alignment of the machine to insure accurate work. All revolving parts, such as shafts and studs, are of crucible steel, ground to size, and where desirable the bearings are suitably bushed. The machine is heavily constructed. Its floor dimensions are 8 x 14 ft., and its weight 7800 lb.

The directors of the Illinois Central Railroad have employed experts to report on the proposal to electrify its Chicago terminal, the agitation against smoke being a prime moving cause. The suburban line is elevated north of Grand Crossing; the lake is convenient for the supply of water for condensing engines and coal is cheap. The *Railroad Gazette* points out that the express train schedule in suburban service would be greatly improved, while in the case of local trains noise and cinders would be eliminated, and there would be a saving over steam locomotives in all suburban business. "Electrification of the through passenger and freight trains and their operation by electric locomotives is a larger problem, but from an engineering standpoint it is easily possible, and there are no great difficulties in the way of designing a power plant which will answer for both services."

The American Railway Association's figures for September 16 show that in the preceding two weeks the number of surplus freight cars decreased by 50,562, more than half the total, or 27,300, being box cars. The number of idle cars on September 16 was 170,652, as compared with 413,338, the maximum, in April. It is now stated that in addition to the above total 200,000 cars were in shops awaiting repairs in April, or about twice the normal number.

A New Fosdick Boring, Drilling and Milling Machine.

In the design of its new style O horizontal boring, drilling and milling machine the Fosdick Machine Tool Company, Cincinnati, Ohio, has given particular attention to convenience of operation. As may be seen in the illustration, all operating levers and hand wheels are on one side within easy and convenient reach. Another important feature is that all wearing surfaces and bearings are large and are adjustable for wear. All bearing surfaces are scraped and all bearing journals, shafts and spindles are ground. All gears are of steel, are bronze bushed and are entirely encased, as are all moving parts. The spindle is of crucible steel and has the company's new adjusting device. The table is unusually deep and well ribbed and has the long narrow guide type of bearing. The outboard support is designed to withstand the strain of heavy boring and milling and can be entirely removed if necessary. An adjustment is provided for alignment should the operator change the position of the head when the support is off the machine. The machine is exceptionally rigid, and being self-contained requires no special foundation.



The New Style O Horizontal Boring, Drilling and Milling Machine Built by the Fosdick Machine Tool Company, Cincinnati, Ohio.

The spindle travel is 22 in., the vertical travel of the head 21 in., the lateral travel of the table 36 in., and the cross travel of the table 28 in. The distance from the face of the spindle to the boring bar support is 60 in. The outboard support can be taken down for overhanging work. The spindle travel and table cross travel are by power in either direction, and all are equipped with micrometer adjustments. The working surface of the table is 50½ in. long by 23½ in. wide, and has four 13-16 in. T slots and six stop holes.

The spindle is crucible steel and runs in bronze bearings adjustable for wear and absolute alignment with the outboard support bearing. It is 3 in. in diameter in the driving sleeve and 1½ in. in diameter in the rear sleeve. The driving sleeve is equipped with a device whereby the spindle can be held true after any amount of wear. The end thrust is taken on ball bearings. The end of the spindle contains a No. 5 Morse taper socket with cotter key.

The drive is positive throughout and two mechanical changes of speed are made through positive clutches. Either a cone pulley or a constant speed driving pulley may be furnished, adapted to take a 3-in. double belt. The spindle speeds, which are eight in number, range from 12½ to 155 rev. per min., and all are reversible. The eight changes of feed also are reversible and vary from 0.007 to 0.25 in. per revolution.

The machine occupies a floor space of 13 ft. in line with the spindle by 7 ft. 8 in. wide to permit the extreme limits of the table travel. The net weight is about 7500 lb. The countershaft has friction pulleys for forward and reverse drive, taking a 3½ in. double belt, and is intended to run at about 400 rev. per min. Where an electric motor is preferred any style of motor can be connected to the machine through spur gearing, and one of 5 hp. is recommended. A constant speed motor can be applied in connection with the company's gear box for speed changes or a 3 to 1 variable speed motor can be used, giving sufficient range of speeds electrically.

Fatalities in Open Shop Structural Work.

Announcement was made last week by the Allied Iron Association of New York City that it had again declined the application of the Housesmiths' and Bridgemen's Union for recognition and had reaffirmed its policy of employing the housesmiths on the open shop plan. The union has recently complained to New York City officials that large numbers of housesmiths were killed in the erection of the Chelsea piers, Blackwell's Island Bridge and other "open shop" work in New York, alleging that there were 15 deaths during the construction of the Chelsea piers and 55 deaths during the construction of the Blackwell's Island Bridge, owing to the employment of inexperienced men. Commissioner Walter Drew of the National Erectors' Association and the Allied Iron Association says that three deaths only occurred in the course of the erection of the Chelsea piers, that only 13 men were killed during the work on the Blackwell's Island Bridge, and that three of the men killed were old union men of long experience, who were working on the open shop plan. He adds that the proportion of men killed during the erection of the Blackwell's Island Bridge was one for every 4000 tons of iron erected, while during the work on the Williamsburg Bridge, a strictly union contract, one man was killed for every 1340 tons erected.

The Open Hearth Committee of the Carnegie Steel Company, made up of superintendents of the open hearth departments at Donora, Clairton, Homestead and Duquesne, visited the company's Ohio works at Youngstown, Ohio, last week, in order to inspect the new open hearth plant, comprising 12 50-ton furnaces, now being erected there.

The Gayley Dry Blast at the Warwick Furnaces, Pottstown, Pa.*

BY EDWARD B. COOK, POTTSTOWN, PA.

The installation of the Gayley dry air process appealed specially to the management of the Warwick Iron & Steel Company, for the reason that for 15 years records had been kept at the works of the company, showing the amount of water entering the furnace in the form of aqueous vapor, and careful observations had been made of its effect upon the working of the furnace. Some years had proved much worse in their effect than others, on account not only of excessive moisture, but also of great variation in the moisture from day to day, and sometimes within a few hours. It had been found impossible to make a satisfactory percentage of high silicon foundry iron in summer, even on high fuel, and for some years the endeavor had been made so to arrange the sales that during July and August only a small per centage of the iron produced would be required to carry more than 2 per cent. silicon. Our larger furnace, running on basic iron, year after year, produced in February a tonnage 20 per cent. higher than in August, on a much lower fuel consumption, while, at the same time, the summer months were marked by "messes," tuyeres closed by slips, and other irregularities, constituting serious additional business losses.

Details of the Warwick Installation.

In the spring of 1906 it was decided to install a plant of sufficient capacity to treat 70,000 cu. ft. of air per minute, an amount much larger than that treated at the Isabella plant, and sufficient for the maximum requirements of our No. 1 and No. 2 furnaces. The form in which Mr. Gayley's invention was applied at our works may be outlined as follows: Ammonia, liquefied by pressure, is allowed to expand in pipes inclosing smaller pipes which carry brine; and this brine, thus cooled to a point below 0 degree C., is conducted through a refrigerating chamber in coils of pipe, over which the air of the blast for the furnace passes, and upon which it deposits its moisture before entering the blowing engine.

The refrigerating part of our plant, which was furnished by the York Mfg. Company of York, Pa., comprises five vertical single acting compressors, each employing about 220 hp. and having 175 tons refrigerating capacity.† The object in having so many units is to guard against serious results from breakdowns, and also to have a more adaptable apparatus. Only in the summer months is the total capacity required. In winter one compressor will do the work for one furnace. An atmospheric condenser was installed above each compressor.

The brine coolers are of the double pipe class, with 3-in. outer pipes, in which the ammonia expands, and 2-in. inner pipes, through which the brine passes in the opposite direction. Through these coolers, and thence through the coils in the refrigerating chamber, the brine is forced by one of two flywheel pumps. The cold brine enters the coils at the top.

The refrigerating chamber contains 57 miles of 1¼-in. wrought iron pipe, divided into seven sections by partition walls and doors, so that one section can be washed free from frost without affecting the other sections or increasing the moisture in the treated air. A large Sturtevant fan was installed to furnish air to the refrigerating chamber, and maintain therein a pressure of about 1 oz. per square foot, in order to insure a proper distribution of the air rising through the coils, and also to overcome the friction in the pipes to the blowing engines, so that there shall be no doubt as to the proper filling of the blowing tubs. It also guards against the entry of untreated air through possible leaks in the pipes. We have found, however, that the plant can be run for a short time without this fan.

Upon the assumption that 4.5 tons of air are required to make 1 ton of iron, the production of 720 tons of iron a day calls for the treatment every hour of 135 tons of air, moving at a rapid rate, and varying both in temperature and in contained moisture. We had our share of troubles at the beginning, but for several months past none has been experienced, and the dry air plant is earning the reputation of being the only "sure thing" about the furnace.

Dry Blast on No. 2 Furnace.

Our first application of the dry blast was made on our No. 2 furnace, which was 100 ft. high by 22 ft. bosh and 15 ft. crucible and stock line. This furnace had been in blast for nearly three years and had made more than 500,000 tons of pig iron. Down to June, 1907, with the exception of the three summer months of each year, the fuel consumption had been kept low and the iron satisfactory. But for almost a year before that date we had had high pressures and irregular settling of stock; and this we had attributed to poor distribution, due to the loss of the stock line, which we had found in very bad shape when we had a chance to see it while changing our bell in October, 1906.

On August 8, 1907, two compressors being ready, the dry blast was applied. That day the moisture per cubic foot of air in the blast was reduced from 7 grains to 5, the next day to 4 and the third day to 3. The first effect was to brighten the tuyeres, so that they shone like stars. The slag increased greatly in temperature, and smoked so that one could not stay in the cast house while it was running. The iron ran so hot that even gray iron "sparked" all the way down the runner. The driving of the furnace increased, and the engines had to be slacked every day in the attempt to keep the rate of driving the same, while the burden was increased daily to keep the silicon in the iron down to 1 per cent. The third day the furnace stuck tight, and it was impossible to get the full volume of air in at a pressure of 25 lb. This trouble yielded to large blanks, but only for a day or two. The moisture was gradually reduced to 2 grains per cubic foot, and held constant at that point. The quality of iron improved, but tonnage and fuel economy did not, on account of the sticking fast several times a week for from 6 to 10 hr. at a time.

It seemed as if the dry blast, requiring an increase in the burden, had aggravated the trouble due to bad distribution and irregular interior lines. In September the moisture was reduced to 1.5 grains per cubic foot of air, in October to 1 grain, and during November and December to about 0.8 grain. The tonnage of daily product remained low on account of frequent stops and our efforts to keep the iron made within "basic" specifications.* As a whole the furnace was worn out. The top gave way twice, and all the gas went out of holes in the platform instead of down the down-comers. The stoves and boilers caused many stops. The fuel consumption was increased by the numerous big coke blanks necessary to lower the pressure, so that the blowing engines could run.

In spite of all these difficulties the furnace was kept running, and her work steadily improved until she was blown out on December 27, on account of our accumulation of basic iron, due to the closing of steel works. There were short periods of good work (when the pressure stayed down and there were no stops), in which 515 tons a day were made on 2000 lb. of fuel per ton for several days in succession.

Figs. 1 and 2 show the condition of No. 2 when blown

* A paper read at the Chattanooga meeting of the American Institute of Mining Engineers, October 1-3, 1908.

† To quote from a refrigerating company's catalogue: "The unit by which capacity is measured is the cooling effect or work done by the melting of 1 ton of ice, and is called the refrigerating capacity. This is stated in tons of ice-melting capacity per 24 hr. continuous operation. The cooling effect of a ton of ice is equal to 284,000 B.t.u."

* These qualifications are: Silicon under 1; sulphur under 0.05; and phosphorus under 1 per cent. But in order to have a good reputation, we try to keep these elements below 0.7, about 0.03, and below 0.8 per cent., respectively.

in and when blown out. In Fig. 2 the stock line, 22 ft. 8 in. in diameter, is shown, with a large shelf below it, where the brick had stopped disintegrating on account of a change in quality. Further down there was another shelf, made up of scaffold material. The scaffold did not fall until a week after the furnace had been cleaned out, and then filled her hearth 5 ft. above the tuyeres, so that she began to yield to gas and had the appearance of being in blast again. We never imagined that the scaffold could be so high up, and consequently did not find it, since we did no drilling higher than 4 ft. above the mantel. Three times during the summer the furnace had been blown down to below the mantel.

The following is the record for the last six months of the blast. The increased percentage of basic iron and

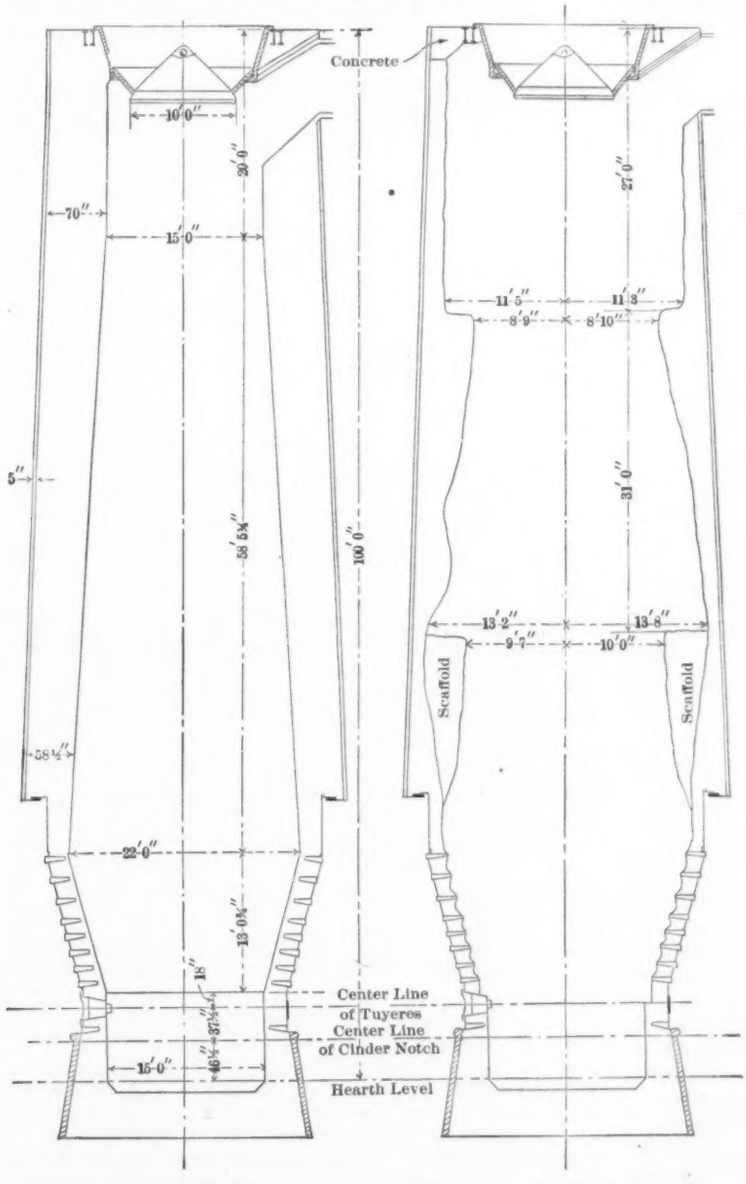


Fig. 1.—Furnace No. 2, Blown In November 1, 1904.

Fig. 2.—Furnace No. 2, Blown Out December 27, 1907.

tne lowering of fuel consumption in a furnace without a stock line and with a large ring scaffold are remarkable:

Record of Furnace No. 2.

1907.	Fuel per ton of iron.—Pounds.	Tons of iron per week.	Percentage of basic iron.	Aver. stoppages per week in minutes
July	2,534	3,025	89.2	194
August	2,452	2,649	69.0	528
September	2,503	2,638	78.2	441
October	2,501	2,927	82.2	336
November	2,339	2,735	80.4	336
December	2,261	2,880	88.5	319

No. 2 furnace has since been repaired, but trade conditions have not been such as to render it advisable to blow in. We have not, therefore, had the opportunity to test the dry air blast on the newly lined furnace.

Dry Blast on No. 1 Furnace.

On September 25, four of the compressors having been completed, the dry blast was put on No. 1 furnace. In three days the moisture per cubic foot of air was reduced from 6.5 grains to 1.50. There was the same evidence of greatly increased heat, shown by tuyeres, slag and iron, as at No. 2 furnace. No. 1 had been in blast for 2.5 years on high silicon foundry iron. The settling for the first year had been entirely by 4-ft. jumps, and the fuel consumption had been consequently high and the iron irregular in grade. After the first years the three top rows of the five rows of bosh plates were pulled out of the furnace. This resulted in regular settling on foundry iron and lower fuel consumption. In March, 1907, however, an attempt was made to turn this furnace to the production of basic iron. It proved impracticable, because an arch formed on the step left by pulling out the plates. The furnace stuck fast for 24 hr. and would not settle at all, so that she had to be put back on foundry iron. During the summer of 1907 her work became extremely bad and the iron was irregular in grade.

Upon the application of dry blast in September the furnace acted much as she had done in March, when the attempt was made to make basic iron—that is to say, the reduction of fuel (or, what is the same thing, the increase of burden) and the consequent lowering of the zone of fusion brought about a tendency to arch at the offset on the bosh. The daily product increased about 10 per cent., and the quality of the iron improved somewhat. The fuel consumption had to be kept relatively high in order to run the furnace at all. She was blown out on November 11 on account of our accumulation of foundry iron. The dry blast had been used on her for 45 days, hardly long enough to get significant results from an old furnace. If the market had warranted keeping her in operation there is little doubt that she would have improved. Fig. 3 shows her original and Fig. 4 her wear, lines and the step on the bosh.

The effect of the dry blast on these two wornout furnaces was a matter of great interest to the management. The first effect was to make them more troublesome, but this was explained by later experience as due to the too sudden application of the dry blast. The improvement in their work was slow by reason of the necessity of forming gradually somewhat different interior lines. In the light of recent experience we are wondering whether No. 1 would not have done better had we the courage to put on a heavy burden in spite of the shelf on the bosh.

Dry Blast on No. 1 Furnace Relined.

No. 1 furnace was relined as shown in Fig. 5, there being practically no change in the lines, except that the crucible was made larger in diameter. The bosh is held by two rows of plates with a bosh jacket above, on which there is 9 in. of brick. The idea is to avoid the cooling on the upper bosh (which seemed to cause the stock to settle irregularly during the previous blast), and still to be able to maintain the lines of the bosh, so that basic iron can be made if desired. The furnace was lighted March 12, 1908. Ten days after the first iron was made the dry blast was applied. The moisture was lowered from 4.5 grains on Monday, March 24, to 1.5 grains on Tuesday. The revolutions of the engine were reduced 10 per cent. at the same time and the burden was increased 5 per cent. The effect was immediate. At 9

a.m., when dry blast was applied, the silicon in the iron was 2 per cent. At 5 p.m. it was 2.75 per cent. Increased heat in the hearth was indicated by the appearance of tuyeres, slag and iron.

The rate of driving decreased but little. That night the furnace stuck fast; the blast had to be thrown off to get her down, and she began to become cold. The moisture was then lowered to less than 1 grain per cubic foot. The next day the sticking continued and the pressure went up to 15 lb., at times stopping the engine. The applying of cold blast did not lower the pressure. It was necessary on these occasions to relieve the pressure entirely by throwing off the wind. The furnace would then settle; but the trouble reoccurred, sometimes at once, sometimes not until after 12 hr. The iron got hard and the cinder black, but both ran very hot. The burden was reduced 7.5 per cent., and the blast was increased, but that made matters worse.

After five days of unsatisfactory work, we came to the conclusion that the furnace was underburdened. The sudden application of dry blast had greatly increased the heat of the hearth. This increased temperature, not being met by increased work in the form of heavier burden, necessarily worked high up in the furnace, causing sticking at the top of the bosh. The CO in the gas increased to 32 per cent. The burden was increased 15 per cent. in one change. When this came to work, the pressure held constant, and the furnace has been settling regularly since.

If there was any one thing that proved the power of dry blast to us it was this experience in putting it on too fast. At Isabella they always take at least ten days, putting on one-quarter, and slowly burdening up, and so on. At Cardiff they followed Isabella practice. We have learned our lesson, and in the future will blow in with dry blast if possible, and, if not, will put it on very slowly.

The next week, the fourth of the blast, the furnace made 1311 tons on 2090 lb. of fuel. She has since, in several different weeks, made nearly 1700 tons a week on less than 1900 lb. of fuel, with heats under 900 degrees, and an ore mixture of 50 per cent. magnetic concentrates, and only 25 per cent. of Lake ore. She has made 1400 tons of iron, averaging 2 per cent. of silicon on less than 2200 lb. of fuel per ton, on the same mixture, but with 1000 degrees F. of blast temperature. The monthly records are as follows:

Record of No. 1 Furnace.

1908.	Product per week. Tons.	Percentage of foundry iron.	Yield of ore. Per cent.	Blast temperature. Degrees F..	Fuel per ton of iron. Pounds.
April	1,392	3	57.5	882	2,061
May	1,532	21	56.7	920	2,059
June	1,451	77	57.1	968	2,131
July	1,501	32	57.4	907	2,006

April was practically the first month of the blast, and the early troubles occurred in its beginning. In May and June much high silicon foundry iron was made, some of it carrying more than 3 per cent. of silicon. In July there were a number of small stoppages, and one of more than 18 hr. Warwick is a merchant furnace, and the iron made must suit the order book. At the present time the changes of grade are consequently frequent, and the convenience of the furnace is not considered. We have no comparative records on basic iron. The nearest is the record of forge iron, in 1898, when the ores were entirely different and the blast temperatures much higher.

Product per week.—Tons.	Yield of ore. Per cent.	Heat of blast Degrees F.	Fuel per ton of iron.—Pounds.
1,246	61.21	1,234	2,378

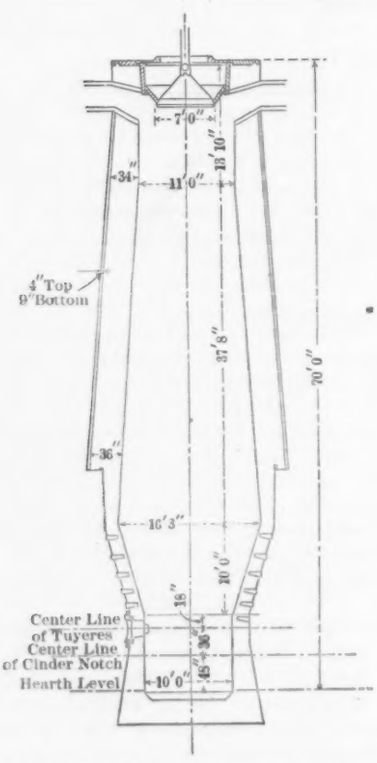


Fig. 3.—Furnace No. 1, Blown In August 3, 1905.

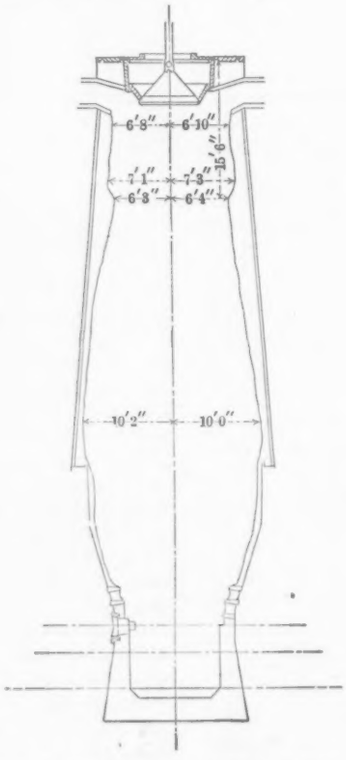


Fig. 4.—Furnace No. 1, Blown Out November 11, 1907.

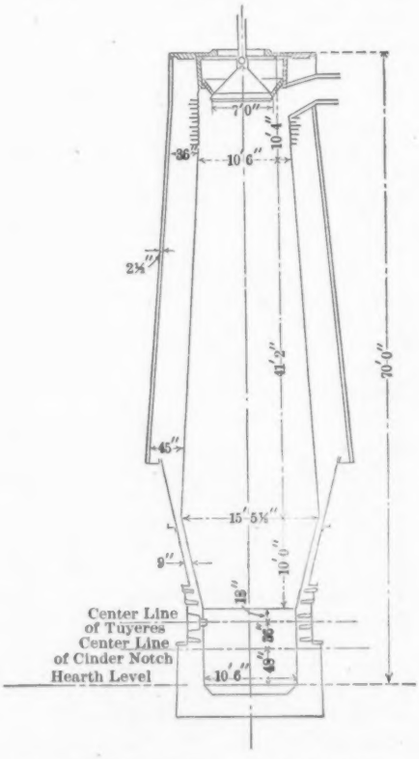


Fig. 5.—Furnace No. 1, Relined, Blown In March 12, 1908.

The best previous record of recent years on foundry iron is that of 1906, as follows:

Product per week.—Tons.	Yield of ore. Per cent.	Heat of blast Degrees F.	Fuel per ton of iron.—Pounds.
1,016	57.3	1,016	2,633

Increase in Output and Saving in Fuel.

We feel that, at a moderate estimate, we are saving 400 lb. of fuel per ton of iron and making 350 tons more iron a week, notwithstanding our lower blast temperature and a much more refractory ore mixture. Although the fuel economy shown is not as great as that exhibited by the Isabella furnace, comparatively it is as good. It is a remarkable fact that all the furnaces using dry blast are showing about the same percentage of saving of coke and increase of product as compared with their previous work. The dry blast is by no means a cure all. Although it greatly increases the regularity of the furnace and enables it to be run closer, this very fact of doing away with the margin of safety, and running on a small slag volume and a siliceous slag, makes the furnace more sensitive to changes of coke and variations in the character of the ore mixture.

Details of Operation.

The settling of No. 1 furnace is very uniform, and she keeps level on top. On changing from one kind of iron to

another we have irregularity, and occasionally have to slack her; otherwise she settles regularly. It is most unusual for her to make a jump, even during a cast. The blast pressure varies from 9 to 10 lb. per square inch, according to variation in blast heat, and the use of three different kinds of coke. The dry blast plant is about 150 ft. from the No. 1 blowing engine, and the pipe is not protected from the sun. The temperature of the air arriving at the engine varies about 15 degrees in summer, between day and night. This makes a difference of, roughly, 5 per cent. in the volume of air that the blowing engine delivers. The effect upon the furnace is to make her drive about 5 per cent. faster at night. On one or two occasions this faster driving has lowered the silicon in foundry iron; otherwise it has given no trouble. An attempt was made for a time to run the engine 5 per cent. faster on the day shift if the sun was shining, or 2.5 per cent. faster if the day was cloudy. But this was soon given up, as it was too complicated, like the changing of blast temperature to meet variations in humidity.

On one occasion the dry blast plant was stopped from 8 a.m. to 6 p.m. to make a change in the brine piping. The moisture rose from 0.63 to 4.08 grains per cubic feet of air. The silicon in the iron made dropped from 2.5 down to 2 per cent., and then went back to 2.75 per cent., when the moisture was reduced again below 1 grain per cubic foot.

Sometimes the first flush of cinder after a cast was gray and the next black. This was invariably followed by a cast much higher in phosphorus and somewhat higher in sulphur. There was no slip nor any indication of a slip on top, or in the gas, and we attributed the phenomenon to the occasional running ahead of the high phosphorus magnetic concentrates. This trouble was partly corrected by a rearrangement of the filling and the making of a slightly more basic slag. A steam reducing valve has caused many stops, and trouble with steam at the engine has reduced the tonnage for certain periods.

When the furnace is running on foundry iron, the product is wonderfully uniform in silicon and sulphur as between one cast and another or different portions of the same cast. On basic iron we can safely carry our silicon from 0.2 to 0.5 per cent. without fear, and the sulphur can be held more constant than in a furnace blown with natural air. On two occasions, through a desire to lower fuel consumption, the furnace has been overburdened, and hard iron and buckshot have resulted; but a small amount of extra coke and a reduction of burden to the proper amount has brought the furnace back on good iron immediately.

There are, of course, two ways of running a furnace: First, carefully, to make a regular grade of iron; second, up to the limit, to make large tonnage and reduce fuel consumption, without reference to maintaining a given grade of iron. Running in the first way with the dry blast, it is possible, with ordinary care in keeping the stock regular, to make every cast of the grade desired. Running in the second way, some variation in silicon and sulphur occurs in the product of the dry blast, but not nearly so much as with natural air, irregular in moisture.

The gas stays high in CO (up to 26 per cent.) on account of the use of 50 per cent. of magnetic ore. The temperature of escaping gases on a 70-ft. furnace averages 300 degrees F. on basic and 500 degrees F. on foundry iron.

On account of the regular settling, the flue dust must necessarily be less; but our ore mixture has been so changed that it is difficult to make comparisons. We are inclined to think that it was a mistake to make the stock line so small in diameter, since, with the fine mixture now used, the amount of flue dirt made is considerable. It varies from time to time, even on the same mixture. For several days the amount made is excessive, as if the furnace were channeled; then it decreases again.

Explanations of Dry Blast Results.

Many furnace managers who have seen the Warwick dry blast plant have asked how we explain the results obtained. The following hypothesis satisfies us and may be of interest to others:

Of all the heat value of coke that goes into a furnace only about one-fourth is available for heating the hearth, about one-half is sensible heat in the gas, about one-quarter reduces the ore, some is required to carburize the iron. Now the hearth is the only limit, the only place where the ordinary furnace requires more heat. It was estimated for years that dry blast would save only 3 per cent. of coke, but the fact was neglected that this 3 per cent. of the total fuel would be saved to the hearth alone, and that this would amount to four times as much, that is, 12 per cent. of the heat of the hearth, and as the hearth is the only weak place, the efficiency of the furnace would be increased 12 per cent. It is like a chain with one weak link. You increase the weight, say, 3 per cent. of the total chain, but put all the increase of metal in the weak link, and increase the strength of the chain 12 per cent. In this case, the dry blast decreases the duty of the hearth 12 per cent. and allows the resultant heat to be utilized upon increased quantities of iron and slag.

Further, this increased burden, together with regularity of heat supplied to hearth, enables the slag volume to be decreased and the slag made more acid. This again saves fuel. The increased product decreases the radiation per ton of iron and makes another saving. This will vary with individual furnaces, and will be particularly great on those that will stand more wind. The writer believes that a very close estimate can be made on the amount of saving dry blast will make on each furnace.

The temperature of a furnace is increased enormously when dry blast is applied, particularly if it be foolishly put on too fast, as on the No. 1 furnace, but the increased temperature is soon equalized with burden and more work, and the temperature kept at the desired point as in any furnace.

Cost of Refrigeration.

Some estimate of the cost of operating the plant may be of interest. Based on a product of 720 tons a day, and running all the ammonia-compressors, the labor-cost is 2.5 cents a ton. In the fall, winter, and spring months it is 2 cents a ton. The oil, waste, &c., should not exceed a maximum of 1.5 cents a ton. Estimating on an excessive loss of ammonia (one-third of the entire contents of system yearly) the ammonia-cost will be 1 cent per ton. The brine-cost is insignificant. We estimated that 10 cents a ton would cover the cost of operation and maintenance, and we now feel that this will be more than ample.

Judging from the experience of general refrigerating machinery and plants, an annual depreciation charge of 5 per cent. will be sufficient.

No charge is made for steam; for, in our experience, the dry-blast plant has made no additional firing of coal necessary. The reduction in revolutions of the blowing-engines spares enough power to run the refrigerating machinery, brine pump, and fan. Although the gas is leaner and of lower temperature, so that it is not as good fuel, its flow is regular; and there is no sticking after casting, with loss of gas and consequent heavy firing.

Summary.

The management of Warwick feels fully satisfied with its adoption of the dry blast. No explanation is needed to show its great value during the past summer, of extremely high and irregular humidity, at a time when the iron market has been totally demoralized. We are now installing new Roberts center combustion-chamber stoves at the No. 1 furnace, in order to obtain 1300 deg. to 1400 deg. F. of heat in the blast. It is a matter still open for discussion; but we feel that the dry blast will make possible the use of higher heats, and thereby indirectly lead to an additional saving in fuel.

In conclusion, attention is called to the fact that the efficiency of the dry blast has been demonstrated on a small furnace, and that the results warrant the statement that its application will be of particular value to small furnaces, as it gives them the efficiency, and somewhat of the production of iron, of the larger furnaces. The claims of Mr. Gayley have been more than confirmed by the experience of every plant that has installed the dry blast, whether the furnace was large or small, and whatever the fuel and ore mixture and the grade of iron desired.

The E. J. Manville Bolt Head Trimmer.

A machine bolt, such as is shown in Fig. 1, may have either a square or hexagon head, and the same character of blank may also be utilized to make lag or coach screws. Fig. 1 also illustrates the mechanical operations by which such a blank is produced automatically on a heading machine comprising the following elements: A feeding device, by which wire is taken from the coil, straightened, and pushed a required distance into the machine; a cutting mechanism which severs the blanks to exact lengths; dies which receive and protect that portion of the blank which is to form the body of the bolt; a first punch which advances to the projecting end of the blank and compresses it into a cone or other suitable preparatory shape, and finally a second or finishing punch, which, by exerting great pressure, forms the head into the required shape, after which the finished piece is ejected and the process repeated.

Such a machine is called a double-stroke header, and, on a medium size machine, such as was described in *The Iron Age* August 23, 1906, ⅜-in. bolt blanks 4½ in. long can be made at the rate of 65 per min. from annealed and cleaned basic wire, or any stock having a tensile strength of about 50,000 lb. per sq. in. and an elongation of about 25 per cent. Such stock is used when the amount of metal required in the head is excessive, but for smaller heads annealed bessemer wire may also be used.

As will be seen by the foregoing, this process requires that a cold heading machine be used to make a blank having a symmetrical round head which is subsequently to be trimmed into a square of hexagon outline. This trimming operation has usually been performed on a vertical power press of ordinary type, each bolt being placed by hand so that its body or shank is pushed up into the hollow punch during its upward movement. As a substitute for this, which would give greater output per machine and great saving of labor, the automatic bolt head trimmer shown in Fig. 2 has been designed by the E. J. Manville Machine Company, Waterbury, Conn.

The horizontal type of machine has been chosen, having the pillar form of frame which carries a well-fitted gate with large wearing surface. To trim ⅜-in. blanks of 4½ in. length a crank stroke of 5 in. is used. The balance wheel is large and makes 60 rev. per min. An important part of the machine is the feeding device, and, owing to the variety and sizes of work which such a machine must automatically handle, several novel features are incorporated.

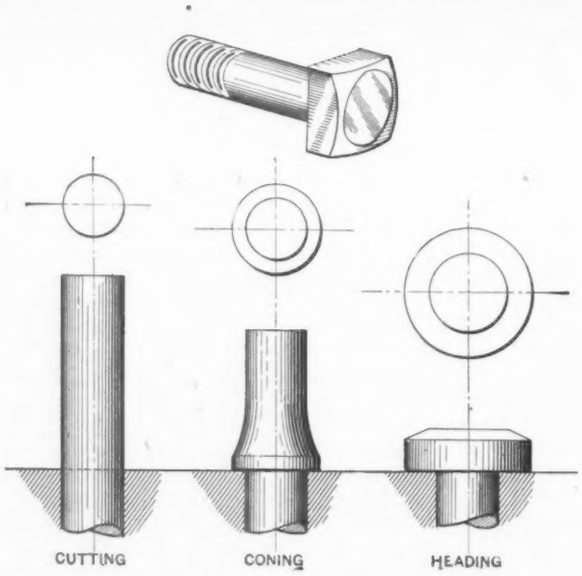


Fig. 1.—A Machine Bolt and Three Stages in Its Heading.

In the feed hopper a slotted blade works upward through the center to raise the blanks by their heads. It is pivoted and swings from a point outside of the hopper, its motion being fanlike. This lifter or blade is made of two plates of steel riveted to a separating piece, the lower edge of which is acted upon by a crank-pin and roller projecting from the face of a plate gear. The latter is rotated by a pinion on the end of a short shaft, having on its opposite end a two-step belt pulley, to which power is transmitted through a belt from a pulley on the main crankshaft.

As this slotted blade or elevator passes upward through a quantity of headed blanks thrown promiscuously into the hopper, several blanks will be lifted by their heads at each stroke, and, owing to the incline of the blade when in its upper position, the tendency of these suspended blanks is to gravitate toward the low end. A continuation of this incline is formed by a raceway constructed of two stationary plates, as may be seen in Fig. 3. This view also shows the heads of a number of blanks which have been automatically placed in proper position by the feeding devices.

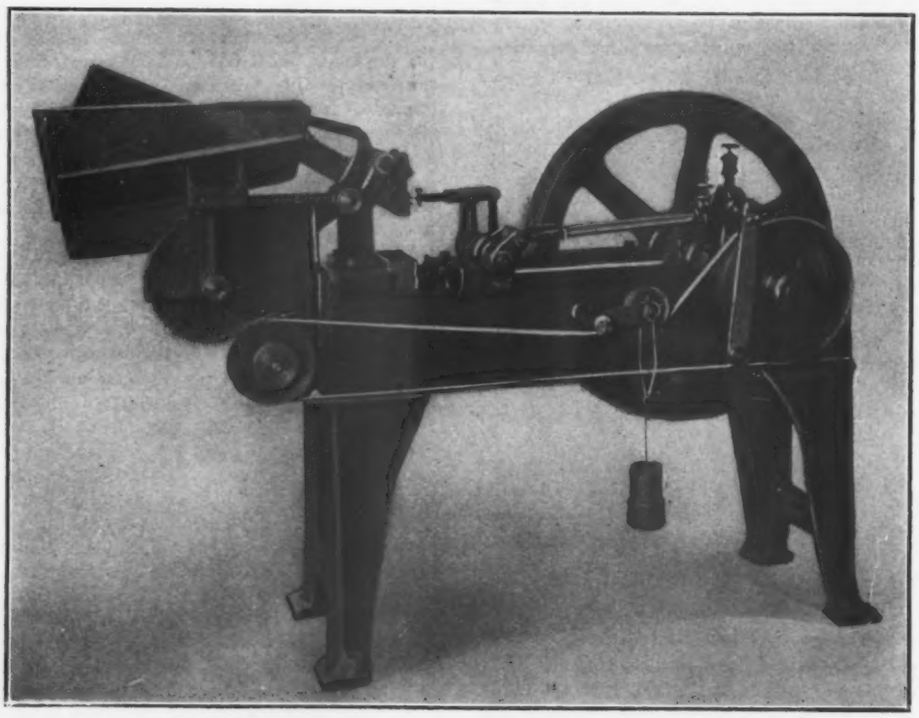


Fig. 2.—The Automatic Bolt Head Trimmer Built by the E. J. Manville Machine Company, Waterbury, Conn.

At the juncture of these tracks with the lifting blade of the hopper a monitor is situated which stops the progress of all blanks not properly delivered to the fixed track and returns them to the hopper, thus insuring a continuous action and automatically guarding against frequent stoppages, which are otherwise inevitable. At the lower end or outlet point for these blanks is a mechanically actuated cut-off device which holds back the descending column of blanks, and at the proper instant separates the lowermost blank from those behind it and forces it outward into the spring jaws of a special carrier or transferring device. In the feeding mechanism all blanks hang naturally, with heads uppermost, up to the instant that they are removed from the tracks by the carrying fingers. This improved arrangement dispenses with guides and other obstructions in proximity to the tools of the machine.

A novel mechanism is used to transfer the blanks from the vertical position at their outlet point at the foot of the tracks to the horizontal position in line with and between the punch and die. This mechanism comprises two rocking shafts, working on the same center, each being moved through an arc of about 90 deg., by two cams on the crankshaft of the machine. Carried on the inner ends of these two rocking shafts are arms, to one of which is pivoted the finger lever, or that carrying the spring fingers which receive the blank from the tracks and deliver it to the dies. A link joins the opposite end of the finger lever to the arm on the second rocking shaft, thus forming a parallelogram link system by which it is possible, with properly shaped cams, to cause the bolt in the fingers to follow a path, giving the bolt the following motion: Assuming that the fingers lie horizontally and have been presented properly to receive a blank from the tracks, the cut-off acts to pass a blank into the fingers, and the finger carrying arm moves the blank away from the tracks a short distance, after which the link-end is caused to rise, thereby depressing the finger-end, as will be seen in Fig. 3, and this motion of the two arms is continued until the blank is carried to its lower horizontal position, where it rests until the hollow end of the square ended punch, carried by the gate, advances a sufficient distance on the end of the blank, and then the fingers move up to clear the punch.

The spring fingers and their holder are readily removed from the carrying lever when another diameter of bolt is to be handled, and provision is made for accurately adjusting the fingers so that they will present the bolt in perfect line with the tools at all times.

To securely retain and carry the hollow punch, a steel holder is provided in the gate, and to take the thrust of this punch a large hollow adjusting screw is used. Running through this punch and screw is a stationary stripping rod, which is held by a post on the frame of the machine.

The die-holding block is bolted to the inner vertical end of the bed, and can be adjusted from side to side. Within this block is clamped the steel die-holder, which may be adjusted in a vertical direction, so that by the two adjustments perfect alignment of the punch and die is easily obtained. The die, being cylindrical, is cheaply made and readily retained or removed for sharpening.

The bolt is presented between the punch and die, as described, and the punch advances on the shank or body of the blank until it reaches the under side of the head, when its further advance pushes the bolt head against the die, and finally into the die, thus shearing it to required shape. The punch then recedes, leaving the bolt projecting out of the die until the gate is on its rearward end of stroke; then the bolt head is pushed out of the die by a knock-out pin actuated from the gate, and the trimmed bolt falls to the floor.

Provision has been made in the matter of quick adjustment to adapt the feed to work of various kinds and sizes, and the relative movement of the punch and carrying fingers is easily changed as required by adjusting the double cam on the end of the crankshaft. The pantograph motion of the linkage carrying the fingers is constant, since both controlling cams are cut on one disk, the outer edge of which is also utilized as the belt pulley for driving the hopper mechanism.

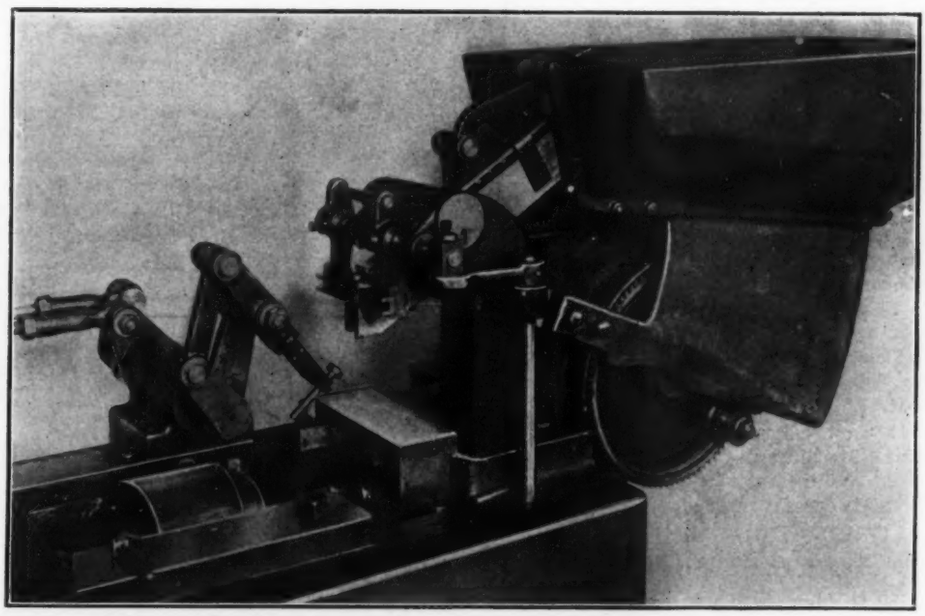


Fig. 3.—An Enlarged Detail of the Feeding Mechanism as Viewed from the Opposite Side.

The Readjustment Committee of the Westinghouse Electric & Mfg. Company closed its two-day session September 24, after practically adopting the plan for the reorganization of the company formulated by the Merchandise Creditors' Committee, which involves the issuance of $10,000,000 of new stock, $6,000,000 to be subscribed for by stockholders, and $4,000,000 to be accepted by the merchandise creditors in payment of their claim. The Readjustment Committee occupied itself for the two days with the reports of the Merchandise Creditors' Committee, which has not yet succeeded in getting either full subscriptions to its plan or the full assents of the merchandise creditors. The Merchandise Creditors' Committee has until October 27 to complete this work.

The Sloss-Sheffield Steel & Iron Company has just blown in a fifth furnace, and the sixth will be put in operation within the next 10 days or so. This will mean a total production of about 38,000 or 40,000 tons of iron a month. It is claimed that increased activity has been made necessary by the fact that the company has entirely sold up the output of four furnaces for the balance of this year, amounting to something like 65,000 tons.

The Wickwire Steel Company's Plant at Buffalo.

The blast furnace of the Wickwire Steel Company, which has been building during the past year at Wickwire, N. Y., 1½ miles north of the Buffalo city line, is now completed. It was blown in October.

The site on which the plant is located comprises about 80 acres bordering the Niagara River, with 1500 ft. of water frontage. It is intersected by the Erie Canal and connected with the New York Central Railroad Company's lines by an industrial spur. Fig. 1 shows the location of the works, with reference to other blast furnace operations in the vicinity of Buffalo. The first pile for the new plant was driven August 2, 1907, but building operations were not commenced in earnest until the completion of the New York Central's spur line tracks into the property, which was September 25.

The plant has a modern layout consisting of docks, ore unloading machinery, ore handling bridge, bins and skip hoists, controlling a single blast furnace stack, and was designed by Julian Kennedy of Pittsburgh, who also superintended all engineering features in the construction of the plant. Fig. 2 shows the general plant, and Fig. 3 a view of the dock. The ore dock is 500 ft. in length and 200 ft. in width, of reinforced concrete construction, tied back to the ore bin foundations every 10 ft. by 2-in. square steel tie rods. This dock is equipped with a Hulett 10-ton electric ore unloading machine, back of which is located a Brown Hoisting Machinery Company's 7½-ton bridge. These machines are both of the latest design, the Hulett machine being capable of handling 300 tons of ore per hour from a boat.

The plant is equipped with the Brown Hoisting Machinery Company's ore bins, with automatic weighing larry and transer cars. The stack, Fig. 4, is charged by a double skip runway, elevated by a 14 x 14 in. Otis automatic steam hoist engine. The furnace is 80 ft. high and 20 ft. 6 in. bosh, with a Kennedy closed top of latest design. There are 11 cooling plates above the mantle, which gives the furnace more cooling surface than has usually been provided heretofore. The furnace is expected to have a daily output of about 350 tons of basic pig iron. The stack is equipped with a cast house, as shown in Fig. 2, and the slag will be run into a granulating pit. The four stoves for heating the blast are 80 x 20 ft., of the Julian Kennedy central combustion type. The gases from the furnace will be run through a dust catcher and then through a gas washer.

The boiler equipment of the plant consists of four batteries of two Babcock & Wilcox Stirling boilers each, with a rated capacity of 350-hp. per boiler. The blowing engine equipment consists of three Allis-Chalmers vertical engines, with 96-in. blowing tubs; there being two high pressure and one low pressure engine. The electric generating equipment comprises two Westinghouse 300-kw. generators, operated by a pair of Harrisburg Foundry & Machine Company's Fleming slide valve engines. The interior of the power house is shown in Fig. 5.

The water supply system consists of a 30-in. intake main from the river opening into a well. There are two general service pumps, which are Jeanesville pattern horizontal compound condensing plunger pumps, and the boiler feed pumps are of the same pattern, but noncondensing. Boiler water is purified by a W. B. Scaife & Sons We-Fu-Go water softening and purifying system of 4000 hp. capacity. All steam is condensed in a barometric condenser made by the Alberger Condenser Company. The pressure upon the water supply is obtained by a stand pipe, 20 x 80 ft. The pig casting machine is a Uehling single strand casting machine, built by the Heyl & Patterson Company, Pittsburgh, with a casting house constructed by the American Pig Casting Machine Company. The steel work in the construction of the buildings, both structural and plate, was erected by the Variety Iron & Steel Works, Cleveland, Ohio. The roofs of all the buildings are covered with the Federal Cement Tile Company's reinforced tile. The steam and water piping was installed by the Jno. W. Danforth Company, Buffalo.

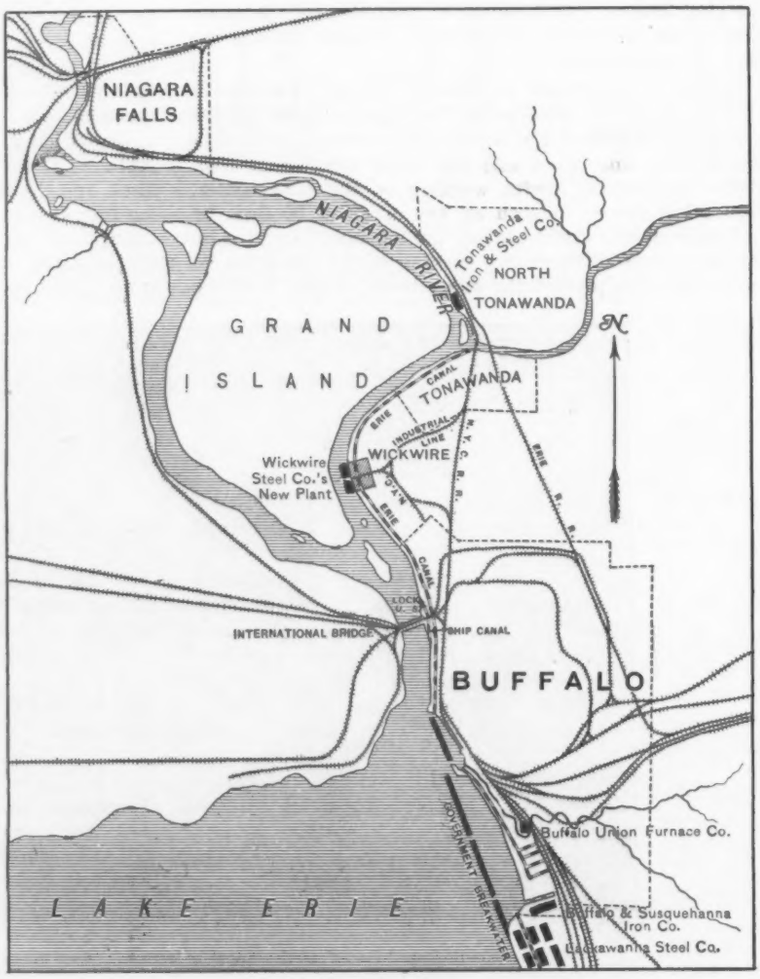


Fig. 1.—Location of the Wickwire Steel Company's Plant with Reference to Other Blast Furnace Operations in the Vicinity of Buffalo.

The power house is served by a 25-ton electric crane, built by the Cleveland Crane & Car Company, and the plant has a 10-ton Brown Hoisting Machine Company locomotive crane for handling granulated slag and other materials around the yards.

The Wickwire Steel Company is closely connected with Wickwire Brothers, Cortland, N. Y., and about one-third of the output of the new plant will be used in their open hearth plant at Cortland as their raw material in the manufacture of wire rods and wire, and the surplus will be sold in the open market by B. Nicoll & Co., New York. The company is in a position to make all the various grades of foundry iron called for by the trade.

The first cargo of ore was received at the ore dock of the new plant June 27, on which date the steamer Kensington arrived with a cargo of 3800 tons, which was the largest cargo of ore that had come down the Niagara River until that time. The company has since brought down a cargo of 6000 tons on the steamer J. J. Boland. On account of the Niagara River draft being limited to 14½ ft.

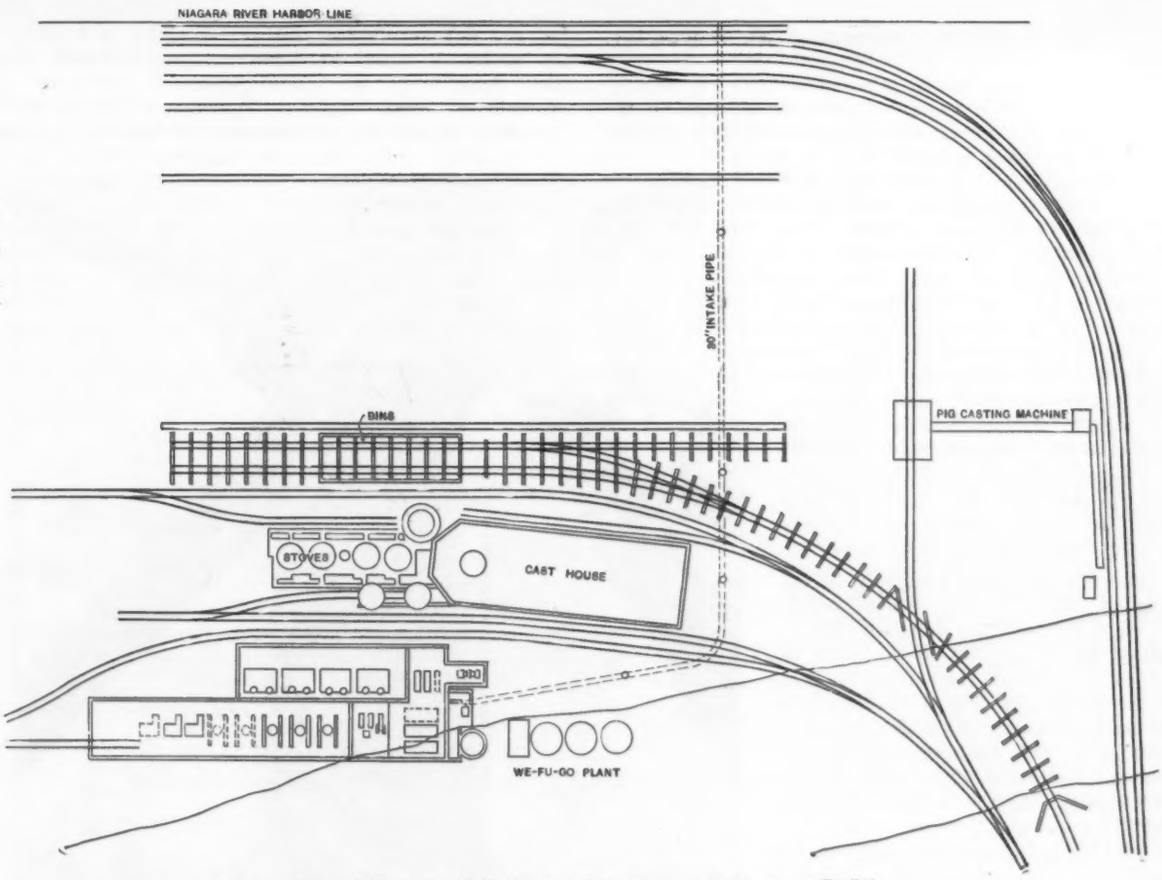


Fig. 2.—General Plan of the Wickwire Steel Company's Plant at Buffalo.

it has been impossible for the larger type of steamers to engage in this trade, and Boland & Cornelius, vessel owners of Buffalo, have commenced the construction of two large steel ore carriers, in which the Wickwire Steel Company is interested and which are especially adapted to the Niagara River trade, permitting large loads on small draft. The boats will have an ore capacity of between 5500 and 6000 tons on a 14½-ft. draft, and when the Niagara Ship Canal, 23 ft. in depth, with lock at Black Rock Harbor, now under construction at Buffalo, is completed, they will be able to carry cargoes to their full capacity.

At the recent meeting of the Western Classification Committee in Manitou, Colo., a rule was adopted, effective January 1, increasing the rate on boots and shoes to one and a half times the regular first-class rate, under which they have been carried heretofore, unless shipped in boxes fastened with cement coated nails. The railroad men assert that the special nails are needed to protect an article which is said to be peculiarly susceptible to theft.

Thomas R. Heyward & Co., Frick Building Annex, Pittsburgh, dealers in alloys, pig iron, steel, coke &c., have been appointed Pittsburgh representative for Frank Samuel, Philadelphia, who handles the Linthorpe-Dinsdale Smelting Company's standard English 80 per cent. ferromanganese and spiegeleisen, and conducts a general importing and exporting business.

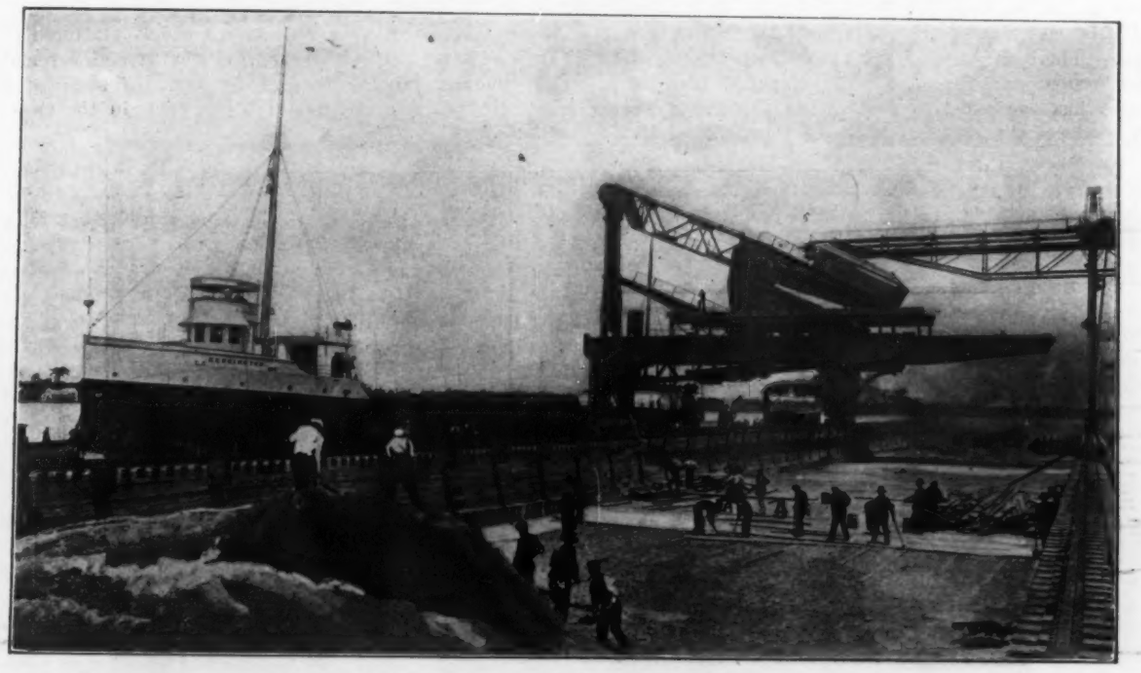


Fig. 3.—The Ore Dock of the Wickwire Steel Company.

The Wire Business Improving at Worcester.

Important improvement is noted in the wire industry at Worcester, Mass., the gain extending through all the works. The great plant of the American Steel & Wire Company has been upon a 50 per cent. basis of production for some time, with certain departments busier than others, as is usually the case at this season. During the last fortnight orders have come in in such increasing volume that production has been so increased as to bring it up to between 60 and 70 per cent. of the capacity of the plant. This improvement is not confined to seasonable departments, but exists throughout the works. A considerable number of men have been added to the payroll.

The same degree of improvement is noted at the works of the Morgan Spring Company, production having increased in about the same measure.

The Spencer Wire Company is running as full as it can without putting on night shifts. This company has not noticed the depression to the same extent as some others, the market for many of the specialties that it manufactures having been better maintained than in most lines. The improvement has been constant for some time, and the last few weeks has seen it even more pronounced.

The Wright Wire Company is fairly busy at both the Worcester and Palmer plants, but it is too early to see improvement, as the products which are now being manufactured do not come into their most active demand normally until later in the autumn. Preparations are being made for a good amount of business.

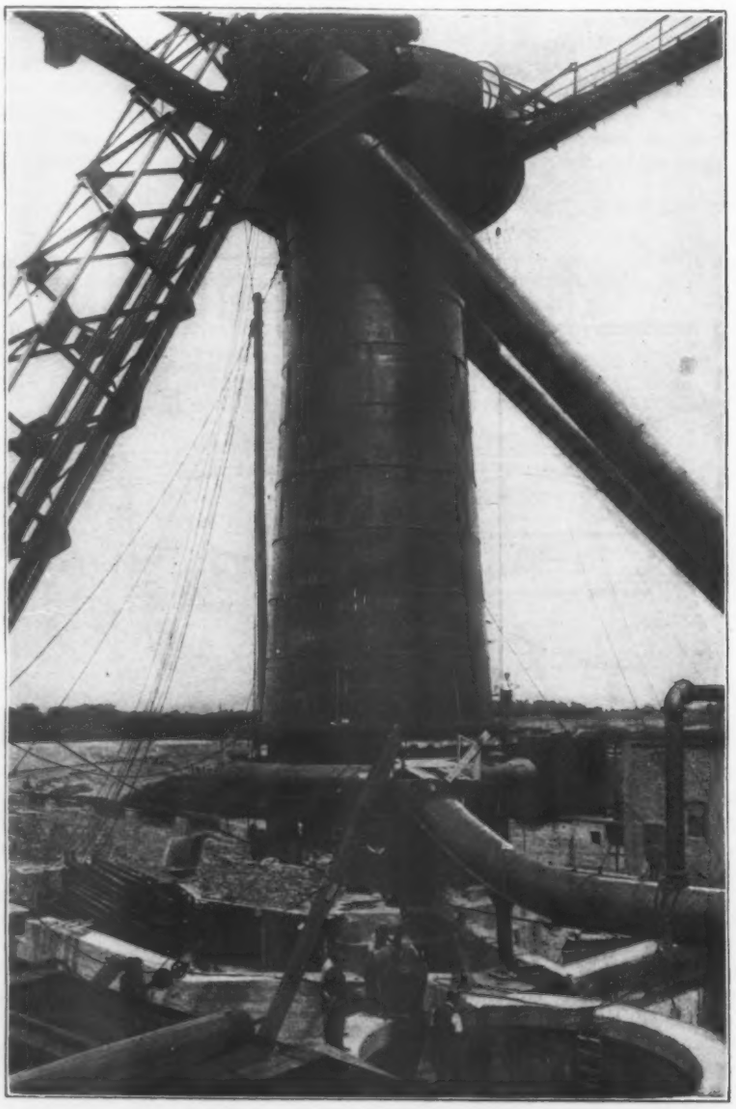


Fig. 4.—The Blast Furnace of the Wickwire Steel Company.

Mexican Railroads.—In a message to the Mexican Congress President Diaz says that 265 miles of new railroad has been built in Mexico in the last six months, and that on September 1 there was a total of 14,665 miles of railroad in the country. Practically all the new mileage is that of the Cananea, Yaqui River & Pacific, which E. H. Harriman and his associates are building down the Pacific slope. The president says regarding the government system of railroads: "The National Railway of Mexico has succeeded in getting the holders of shares and bonds of the National Railroad Company of Mexico and the Mexican Central Railway Company to surrender the securities issued by those companies, which have their domicile in the United States, in exchange for securities of the new company, domiciled in Mexico. Such has been the success of the operation that though the bonds and shares in question were widely scattered over various parts of the world, only a small fraction remains outstanding, ranging from 1 per cent. of some of the securities to a maximum of 5 per cent. in the case of others."

Fig. 5.—The Power House of the Wickwire Steel Company's Plant at Buffalo.

The Schellenbach 18-In. Cone-Driven Lathe.

The substitution of a cone-driven head for an all-geared head is the only difference between the 18-in. x 8 ft. cone-driven Schellenbach engine lathe illustrated in Fig. 2 and the one described in *The Iron Age* May 28, 1908. Both are built by the John B. Morris Foundry Company, Cincinnati, Ohio, and are otherwise of the same general design.

As may be seen from the sectional view of the headstock, Fig. 1, the drive is direct to the face plate, as in the geared-head machine. The spindle *a* has a flange at its right end and receives the face gear *b*, which is doweled and screwed to it. This gear *b* has internal threads and receives the face plates or the chuck. The chuck plate *c* fits the counterbore of the chuck and is bored to fit the end of the spindle and threaded on the outside to screw into the face gear *b*. When pressure is exerted against the chuck it clamps the flange of the spindle tightly between the chuck plate *c* and the face gear *b*. This eliminates all torsional strains within the spindle when the back gear is in use. The clutch teeth *d* are formed upon the spindle and engage the clutch *e*, which is splined to the cone pinion sleeve *g*. This clutch is operated at the left end of the headstock by a spring-seated plunger which passes through the cone pulley. The plunger has a knurled grip with a detent pin in it for holding the plunger out of engagement.

A three-step cone pulley, the largest diameter of which is 12 in., is furnished with this head, and it accommodates a 3-in. double belt. There are two back gear changes, making in all nine changes of speed with a single speed of the countershaft. The countershaft, however, is provided with double friction pulleys, and where a reversing drive is not required it may be driven at two different forward speeds, thus giving the spindle six open-belt speeds and 12 back-gear speeds. The back gear is operated by an eccentric shaft in the ordinary manner. It will be noticed that the overhang of the chuck, from the face of the jaws to the front spindle bearing, is not so great as with the ordinary type of lathe. All of the gearing on the head is enclosed and is of coarse pitch.

This machine is provided with a quick change device, giving a thread cutting range of from 2 to 112 to the inch. The lathe has a double plate apron containing a special arrangement for rough chasing threads by the ordinary rack feed in place of the lead screw, the object being to preserve the accuracy of the screw and to use it only for accurate chasing. A single wrench operates all of the adjusting screws on the machine, including those for clamping the tailstock to the shears. The cabinet legs have hinged doors with latches operated by knobs.

This lathe is also made in 14 and 16 in. sizes and with a plain system of change gears, as well as with the quick change gears shown.

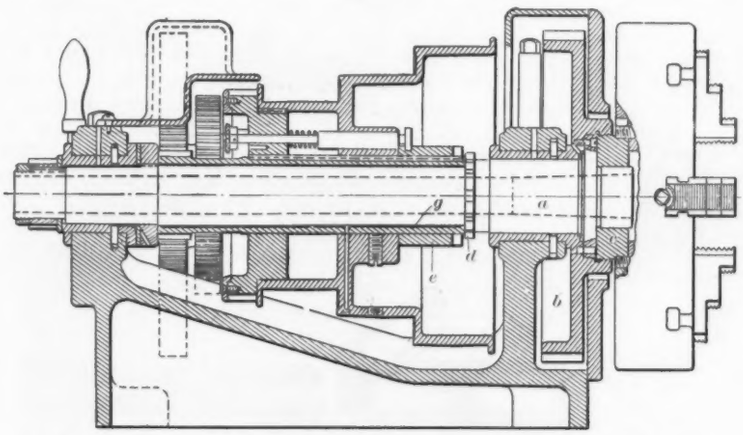


Fig. 1.—Section of the Headstock of the Schellenbach Cone-Head Lathe.

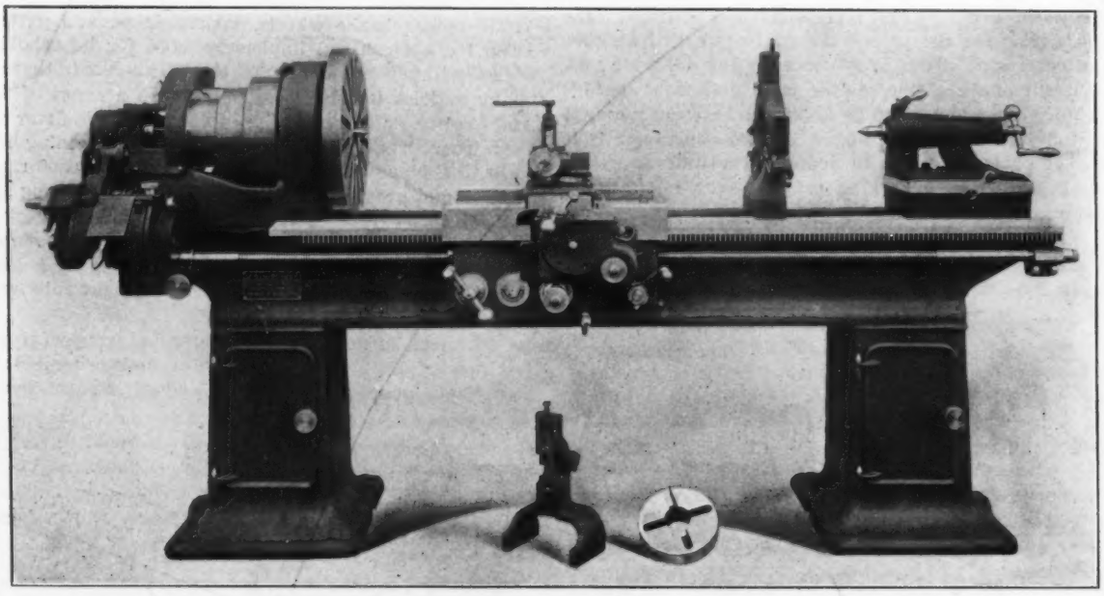


Fig. 2.—The 18-In. by 8-Ft. Cone-Head Schellenbach Lathe Built by the John B. Morris Foundry Company, Cincinnati, Ohio.

Since 1903, when the No. 1 furnace of the Cleveland Furnace Company, Cleveland, Ohio, was completed, ore has been received in cars loaded at a dock farther down the Cuyahoga River, as the channel was not deep enough to permit boats to come up as far as the blast furnace. The furnace company has now completed a 1000-ft. concrete dock and hereafter will unload its ore and limestone from boats, the river having been made navigable to its dock. The American Steel & Wire Company, the Cleveland Furnace Company, Upson Nut Company and Corrigan, McKinney & Co. have joined in asking the city of Cleveland to straighten the Cuyahoga River and further improve navigation facilities.

The Bucyrus Company, manufacturer of steam shovels and dredges, South Milwaukee, Wis., has increased its capital stock from $300,000 to $1,000,000. While the company is doing a very large business in the manufacture of steam shovels and dredging machinery, it is making plans for a still greater output. The additional stock was readily subscribed for by the stockholders.

CASTINGS VERSUS FORGINGS.

The Development of the Respective Fields of Cast and Wrought Iron and Steel.

BY JAMES H. BAKER, PITTSBURGH, PA.

Really only one metal is involved in the present consideration; that is iron as a base. By alloying with other elements, by causing chemical changes in these and by varying physical treatment, we get adaptability to the formation of different shapes in castings, forgings and rolled and drawn material. We also get the advantage of certain physical characteristics, such as tensile strength, resistance to crushing, &c. No metallurgical reader need be told that with the iron, as we find it in the condition of ore, we have phosphorus, sulphur, silicon copper, &c., and that in the blast furnace part of the carbon and sulphur in the fuel is taken up by the iron. All of these elements are generally kept as low as pos-

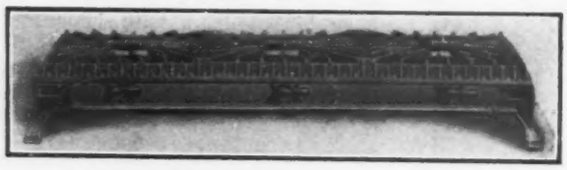


Fig. 1.—Cast Iron Burner.

sible, though pure iron is of little use. It is necessary to control the proportions of such of the above as may be desired, and others are often added, such as manganese, nickel, chromium, vanadium, &c. Detailed reference to alloyed steels is left out of present consideration except to say that their use will likely still further advance the use of castings, especially steel castings. The changes from the use of one material to that of another are often brought about by advances in the different arts. The useful phase of the matter is to find what decides the choice of materials. The difference between wrought iron and steel is not considered in this paper, nor is it any part of the purpose to describe the differences between casting, rolling, forging, cold drawing, roll forging, pressing, drop forging, &c.

Carbon Variations.

Cast iron, having 3 to 4 per cent. generally of carbon, is easily master in resisting compression and in resisting

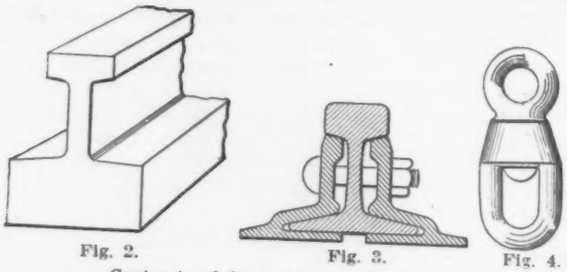


Fig. 2. Fig. 3. Fig. 4.

Contrasts of Cast and Wrought Forms.

corrosion from many causes. When chilled it has a quality all its own. As to castings, at first we had cast iron, and then we got it with steel turnings and scrap of various kinds intermixed in order to make stronger castings. Also we have had castings which were converted into "steel" after being molded in sand, but this has not advanced much. Next we have malleable castings, which are cast iron with some of the carbon taken out and part of the balance and other elements changed. These are made into many intricate shapes, impossible commercially in wrought material, and yet give a service much nearer to wrought iron as to tensile strength and toughness than simple cast iron.

Steel castings come in as another link between cast iron and wrought material. Next is wrought iron, with its tensile strength and ductility above malleable castings. Then comes carbon again in combination and we have steel, which in its mild form is some stronger than wrought iron, and with higher carbon very much stronger. Next come the alloyed steels, either in castings or wrought, which surpass all. But carbon steel—in other words, the regular commercial product—when cold worked, such as cold rolled or drawn shafting, and in one of its highest forms, as high carbon drawn wire, has as much as 10 times the tensile strength of cast iron; hence it is easily seen how widely qualifications for different uses may vary.

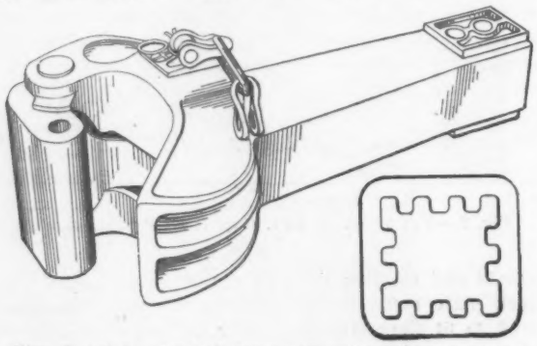
Where Cast Iron Is Preferred.

Much money and often sore disappointment would be saved if fundamental principles were considered at the start. Cast iron being the basic metal is cheapest per pound, but is not therefore the cheapest, even per pound, when it comes to being put into commercial forms. A straight, clean 60-ft. railroad rail cannot be made of cast iron as cheaply as of wrought steel, leaving quality out of the question. On the other hand, for many articles wrought metal would be gladly accepted in place of castings, but price determines that castings shall be used. In this class are door lock parts, engine beds, flywheels,

Figs. 5 and 6.—Malleable Castings for Light and Medium Weight Sprocket Chains.

car couplers, brake wheels, sash weights, and parts for cars, for agricultural implements and for household articles without number. On the other hand, there are many articles in which both prices, on account of form, and quality, on account of granular structure, favor plain cast iron. These include ingot molds, smoothing irons, balls for pipe welding, furnace plates, many forms of forging and pressing dies, finishing rolls for rolling mills, &c. It is true that rolls for heavy roughing work are often preferable in steel, but for finishing, cast iron ones are best and would therefore be used even at a higher cost. They clean themselves, where wrought rolls would let the hot metal stick to them.

A stove burner, Fig. 1, shows a wonderful combination of the economical, useful and ornamental in cast iron articles which will never be reached in



Figs. 7 and 8.—Coupler Draw Bar and Section of Shank.

wrought material. The art of pressing sheet metal is well advanced, but the sharp effect in surfaces and intricate and delicate forms possible in cast iron cannot be realized in wrought material cheaply enough. A stove, whether for gas or coal, is an impossibility in wrought, and even if so made would not stand the heat like cast iron. Cast iron water pipe costs much more per foot than wrought steel, yet it is used almost exclusively for water mains because of its resistance to corrosion by contact with the earth, water, &c. The highly practical difference between the tensile and crushing strength of cast iron is an important factor

in maintaining its supremacy in many articles. This principle is well illustrated in the Hodgkinson beam, Fig. 2, where in order to use a minimum amount of metal to support a given load it has about five times more sectional area in the lower flange than in the top. The beam itself has given place to wrought steel, but the principle remains.

Chilled Castings.

Chilled cast iron has its hardness produced by chemical change taking place from sudden cooling, which is a different matter altogether from hardening a piece of

Fig. 9.—Car Truck Side Frame with Journal Boxes.

steel, for by heating the steel again the hardness may be taken out; but subsequent heating under ordinary conditions will not take the hardness out of chilled cast iron. Another principle often involved in the choice of materials is that of the wear of one on the other. A wrought or fibrous material wearing on a cast iron or granular one is the best condition so far as these metals are concerned. For instance, the wheel box with wagon skein, Fig. 18, is universally of cast iron, on account of wearing qualities as well as cost. Chilling steel castings in the sense mentioned has not so far been done commercially. A little has been done in uniting chilled cast iron to steel castings, but this is limited to plain forms.

Wider Field for More Recent Processes.

The art of casting is so much older than that of rolling, forging and pressing that we may reasonably look for comparatively more development along these

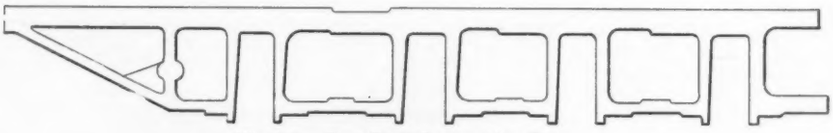


Fig. 10.—Cast Steel Locomotive Frame.

last named lines. As to rolling, slitting rolls for cutting hammered plates into nail rods came first. Sheet rolls are about 175 years old, while grooved rolls have been in use only about 125 years, and three-high rolls came in the last generation. It is only 100 years since formed up sheet metal commenced to displace castings in forms which had been in use for thousands of years. When it

Fig. 13.—Cast Iron Step.

Fig. 14.—Malleable Step.

comes to bars of uniform section, or even those having an alternate limited change of sectional shape and of any considerable length, price alone determines the choice of the wrought, while the quality is also in its favor. In this list are such as railroad rails, wire, concrete reinforcing bars, frames for buildings, bridge members—in fact, an endless number.

The matter of freight for long distance often decides the choice of material, as some articles can be made in wrought so much lighter than castings. This factor is highly important where muleback transportation is involved. In rail joints, forms which can only be made of steel castings will be limited in use because of the uniformly close fit necessary. Many efforts have been made to produce these in castings, but even such forms as Fig 3 are made cheaper in wrought, and there can be no question about their being better. In journal boxes for railroad cars efforts in pressed steel are quite recent, but so far there is nothing to report. In journal box wedges drop forged ones have made considerable advance against castings, but the great body of these are still made in castings, mostly malleable, and it will be interesting to watch the outcome.

Malleable Cas ings and Their Adaptations.

Malleable castings with their large development are limited to a considerable degree by size, or rather by thickness of section, owing to the fact that this material differs physically and chemically from the surface to the center. The best part is on the outside, and the nearer

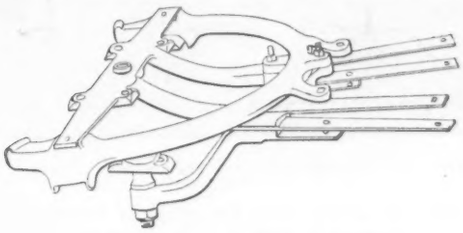


Fig. 15.—Fifth Wheel in Malleable.

that this better condition can be made to reach clear through the better the article. A section containing 1 sq. in. would be much better if of ¼ x 4 in. than of 1 x 1 in. There are, therefore, many articles which are of excellent quality in lighter sizes of castings, but in heavier are better of wrought; hence another condition

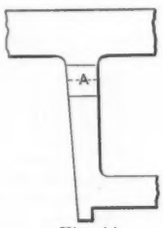


Fig. 11.

Fig. 12.

Parts of Forged Locomotive Frame.

divides the uses of the two materials—namely, where size determines the quality. Chain swivels, Fig. 4, are largely, in fact almost wholly, made of malleables in the lighter sizes, say up to ½ in. But when it comes to a swivel, say, for a 2-in. chain, which must pass through a 9-in. circular opening and uniformly stand a test of 250,000 lb. pull, malleables are not equal to the requirements, owing to the thick section. Harness snaps are almost wholly made in malleables, of course, with a wrought steel spring, and yet some of the heavier ones are demanded, and a comparatively few are made, in wrought.

In sprocket chains, Fig. 5, for light work malleables have maintained their lead. And for medium work they are giving good service where the section can be thinned and the strength increased by making them wider, as in Fig. 6. For heavy work wrought is used because there is little difference in the quality of properly forged material on the outside and that in the center. It was attempted at one time to make the knuckles for car couplers of malleable castings, but they were worthless. At first knuckles were made in wrought, but steel castings are now used altogether or nearly so. Coupler draw bars, Fig. 7, were wholly of malleables until a few years ago, when steel castings began to supplant them and have now taken a large share of the coupler trade. This was partly owing, however, to unwise competition in malleables, which resulted in their falling below their regularly possible efficiency. Steel castings are here to stay, but malleable draw bars are not a thing of the past. This is owing to the principle named, of getting a large sectional area without any exceedingly thick parts in

critical places. Fig. 8 is a section through the shank of Fig. 7, showing how sectional area is much increased without thickening too much at any point. These draw bars are too difficult to make in wrought.

Increased Use of Steel Castings.

Steel castings have been greatly developed in the last decade, and especially in the last five years. They cannot be molded into the finer forms possible with cast iron, and therefore in malleable castings, nor can they be produced of as uniform quality as wrought steel, but they have

Fig. 16.—Automobile Forging.

made marked inroads into the fields of wrought metal and gray iron castings. One of their advantages is the elimination of separate parts. Fig. 9 is a side frame with journal boxes for a car truck, in one piece. It shows the tendency and the useful field for advances in this art. Bolsters and side frames of various designs in steel castings are coming to the front commercially, and complete standard gauge car bodies are now made in one piece for furnace charging, &c. Patents have been issued for a truck bolster, side frame and all the journal boxes

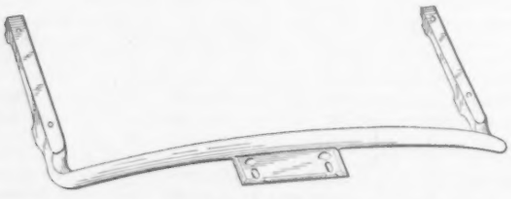


Fig. 17.—Formerly Malleable Casting, Now Largely Wrought.

in one piece. Wrought bolsters and side frames are, as a rule, lighter and cost less, but the reduction in the number of parts by the use of steel castings is working a change. This change may go to greater lengths, or it may find an equilibrium in a combination of wrought and castings.

Many articles formerly of wrought iron or steel are now made, and will continue to be made, in steel castings. Locomotive side frames, Fig. 10, when made of wrought require a weld at nearly every corner, and most of these really mean two welds. Figs. 11 and 12 show a part with one V block, A, placed ready to weld, after it had been heated in one forge and the frame in

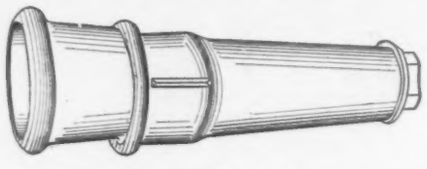


Fig. 18.—Cast Skein.

another. Then the same thing must be gone over again to close the space B, and so on until the frame is completed. This, taken in connection with the expense of forging all these parts before the welding commences, shows how desirable it was to cast this article in one piece. Rudder frames for ships come in the same class and many other parts for ships, while electrical machinery, steam hammer columns, hydraulic press plates and many other machine parts are now made in steel castings. Generally where these displace cast iron it is a question of quality and sometimes of price, because the steel article can be lighter. Where they are used in preference to wrought iron or steel it is a question of price.

There are many articles in which quality determines the choice of wrought material and price has little or nothing to do with it. These include pipe for very high pressure, as well as unions for such pipe, armor plate, shells, springs, boilers, parts of sewing machines, fire-arms, automobiles—an endless list, to say nothing of edge tools. Cannon, as a matter of course, were made at first of castings. The Confederate Government put wrought bands on cast iron guns. Then some 25 years ago efforts were made to produce them in steel castings, recourse being had at last to fine wrought steel throughout.

Some Lines In Which Movements Are Conflicting.

While the trend in many cases is clear as to choice of materials, in others it is not. A generation ago such articles as body loops and steps, Fig. 13, were made in

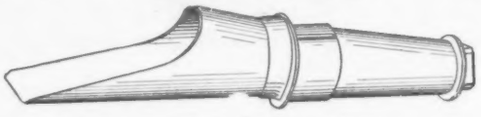


Fig. 19.—Wrought Steel Skein.

wrought. Malleable largely took their place, as shown in Fig. 14. Now many of the same class of articles are again made in wrought. Fifth wheels, like Fig. 15, and numberless other things are hardly approachable by wrought, as the shape is difficult and being light the quality can be good. Automobile parts generally would not be accepted in malleables. Fig. 16 shows one of these in wrought. This illustration shows the high state of the art. Body hangers, Fig. 17, were largely made in malleables, but now are produced in great numbers in wrought. These are rather large, being 2 ft. long, and improved methods in press and roll forging will probably keep the wrought in the lead, both as to price and

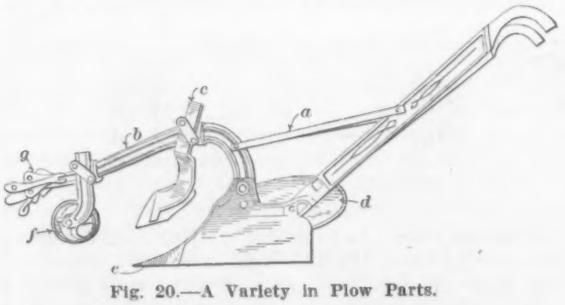


Fig. 20.—A Variety in Plow Parts.

quality. Wagon skeins, Fig. 18, are mostly made of cast iron. Wrought skeins, Fig. 19, have been used for 30 years, but their cost is against them. Skeins were also tried in malleables, but so far these have not advanced much. Bathtubs, which are much larger and generally plainer in form than articles just named, are being ingeniously made in wrought material, but cast iron holds the lead. There has been an advance in the use of wrought steel pulleys, but it will be a long time, if ever, before

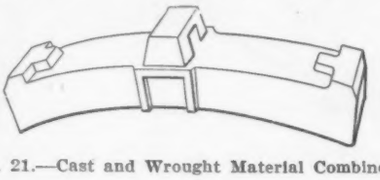


Fig. 21.—Cast and Wrought Material Combined.

cast iron pulleys are entirely displaced in the light and medium sizes, and probably never in flywheel sizes. A question of special interest is whether wheels for freight cars shall be made of wrought material.

Combinations of Castings and Wrought Material.

Without noticing generally built up structures, in which castings and wrought are so commonly combined that we are apt to overlook them, a plow, Fig. 20, will illustrate this class. The braces *a*, the beam *b* and the coulter *c* are wrought. The roller *f* is cast iron. The

clevis *g* is a malleable casting, for while of intricate form it needs to be tougher than cast iron and comparative cost forbids it to be wrought. The mold board *d* is of chilled cast iron, as is also the share *e*. In early days the mold boards were all made of cast iron. Next wrought steel was used—a high carbon surface and a soft steel center or back, so as to be capable of being highly hardened and yet endure use. But the art of chilling cast iron kept advancing and now there are large numbers of mold boards made of this, and owing to their hardness and fine granular structure they operate more satisfactorily in certain soils. A matter of enticing interest is that of uniting the two materials homogeneously, as seen in scissors having cast handles and a wrought steel edge, and in a heavy article, as an anvil. In brake shoes for cars, Fig. 21, the wrought toughens the structure and the cast iron gives the wearing quality. While this is a success in these and other cases, it has not been found widely applicable.

Under the enthusiasm of new ideas, possible combinations and variations make an interesting mental picture and tend to cause a pleasant state of feeling in a man who is in love with his work.

The New Cincinnati Four-Jaw Independent Chuck.

What is known as the 1909 model four-jaw independent chuck with reversible jaws, as made by the Cincinnati Chuck Company, Cincinnati, Ohio, is shown in the accompanying Fig. 1. The principal feature of the chuck is the manner in which the screws are mounted in hardened steel bushings, as shown in the sectional view given in Fig. 2. These bushings provide a full bearing for the trunnions of the screws and receive the end thrust on their hardened full circular faces, minimizing wear and the resultant end play. By contrast the ordinary independent chuck has the screws mounted in semi-circular bearings, which receive the thrust on semi-circular shoulders formed in the cast iron shell of the

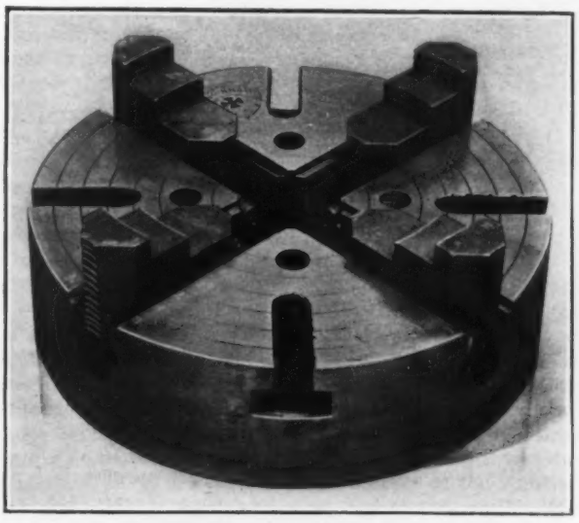


Fig. 1.—The 1909 Model Four-Jaw Independent Chuck with Reversible Jaws Made by the Cincinnati Chuck Company, Cincinnati, Ohio.

chuck. When these become worn in use it is impossible to take out the play. The patented bushings used in the new Cincinnati chuck, providing double the wearing surface on hardened steel surfaces, will wear three times longer, and when end play does develop it can be taken out by any machinist in a short time, making the chuck in this respect as good as new. These bushings also hold the screws in alignment with the jaws, preventing tilting of the screw and consequently cutting of the threads. The screws are made of spindle steel and the bearings are ground. The shell is made of gray iron.

The chuck is made in nine sizes, ranging from 8¼ to 24¼ in. in diameter, each one 2 in. larger in diameter than the next smallest size. The weight of the smallest chuck is 32 lb., the diameter of the hole through its center 1¾ in., the diameter of the recess of the face plate 4½ in., and the capacity of the chuck 8¾ in. The largest size weighs 265 lb., has a 5-in. hole through the center, a recess of the face plate 10 in. in diameter, and a maximum capacity of 25 in. The intermediate sizes have substantially proportional weights and dimensions.

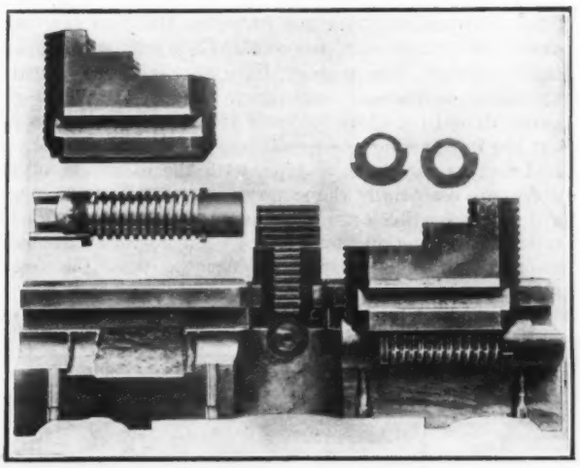


Fig. 2.—Section of the 1909 Model Cincinnati Chuck Showing One of the Screws and Jaws Removed.

The Vitality of the Steam Engine.

Referring to the frequent prophecies of the relegation of the steam engine to the scrap pile because of the gas engine's horsepower hour per pound of coal and the steam turbine's kilowatt hour on 13 lb. of steam, *Power* says:

> Some years ago there was installed in a mill in Belfast, Ireland, a steam engine of some 400 hp. which discharged only 8½ lb. of water per horsepower-hour at the outlet of the surface condenser at normal load. Recently there has been installed at the Central Lighting Station of Brussels, Belgium, a steam engine of 4000 hp., which between half load and full load consumed an average of 9½ lb. of steam per hour per indicated horsepower. An English engine building corporation advertises its ability to install engines with cylinders of 19 and 41 in. in diameter which shall, under certain specified conditions, develop 600 indicated horsepower with a water consumption of not more than 9¼ lb. per indicated horsepower-hour. . . . It is not impossible that the high degree of economy reached by an occasional steam engine installation may in the near future become ordinary practice, and that a steam consumption of 9 lb. or under per indicated horsepower-hour, instead of being telegraphed around the world as something phenomenal, may become as common as the 16-lb. steam consumption of everyday compound engines.
>
> However this may be, it will doubtless remain true indefinitely that the piston steam engine, the steam turbine and the gas engine all have their legitimate respective fields in which they are each practically invincible.

The German Pig Iron Syndicate.—At a meeting of the Rhenish-Westphalian Pig Iron Syndicate, held at Cologne, September 10, the following resolution was unanimously adopted: "This meeting decides, after careful discussion, in agreement with the position taken by the Committee of the Group, that further negotiations with reference to renewing the syndicate be stopped so that the Pig Iron Syndicate is dissolved December 31 of this year." This course, which is due to the adverse attitude of the Eisenwerk Kraft, enables the members of the syndicate to take charge of their own sales for delivery during the next year on October 1. It is believed that district syndicates will be formed, and that arrangements will be concluded between these groups.

The C. & G. Cooper Company, Mt. Vernon, Ohio, is installing two tandem compound steam engines of 3000 hp. each in the Braddock, Pa., plant of the American Steel & Wire Company. These engines will drive the wire and rod mills, which are being considerably enlarged. The Cooper Company is also installing a 4000-hp. tandem compound steam engine in the rail mill of the Edgar Thomson Works of the Carnegie Steel Company.

The New Brown & Sharpe Constant Speed Drive Screw Machine.

In the No. 2 G ⅞ x 2½ in. automatic screw machine shown in the illustration, the Brown & Sharpe Mfg. Company, Providence, R. I., has embodied the constant speed drive, which has been so successfully applied to its milling machines. The type of drive eliminates complicated overhead works and admits of ready equipment with motor drive; the drive is direct from the main line without the intermediary of countershaft. While the mechanical features of the new type, with the exception of the drive, are essentially the same as in the company's standard screw machines changes have been made in minor details of construction, constituting refinements on the older design. All tools are interchangeable with the No. 2 machine.

The main drive is direct to the machine driving pulley which runs at a constant speed. A powerful friction clutch in the pulley and operated by a lever at the front serves to start and stop the machine. The spindle is directly driven by silent running chains, which combine high speed with efficiency. The variations of spindle speed are obtained through change gears and automatically operated friction clutches which give two changes of speed for each change in gears, one fast and one slow, at an approximate ratio of 2 to 1. This constitutes a feature of special value in threading and work of similar character where it is of advantage to employ one speed for turning and another for threading. The entire driving mechanism is inclosed in a case. All of the bearings are bushed with phosphor bronze and are oiled from pockets on the outside of the case.

Some of the mechanical details are shown in Figs. 2 and 3. The drive of the machine is from the constant speed pulley *a*, mounted upon the main driving shaft upon which is the sliding gear *b*, engaging the driving pulley by means of the friction clutch. This clutch consists of the friction ring *c*, which is split at *c'* to permit of expansion by means of a pair of hardened steel rools, *f*, and at *c* to permit of adjustment. The sleeve is operated by a hand lever, shown in Fig. 1, the forks of which are attached to the ring *g*. The action of the lever is to slide the sleeve, which causes the rolls to engage the friction ring and tighten it, the pressure of the rolls being taken on two hardened shoes. Adjustment for tightness of the ring is accomplished by the screw *d*.

The back gear shaft *i* is driven from the sliding gear *b* through the gear *h*. On the opposite end of the back shaft is one of the two change gears, the other being on the same end of the machine driving pulley shaft, to which it transmits the power. On the driving pulley shaft is keyed the clutch body *j*. On one end of the quill on the back shaft are the sprocket *k* and the gear *l*; on the other end is the gear *m*. On one side of the clutch body, on the pulley shaft, is the loose gear *n*; on the other side are the sprocket *o* and the gear *p*, both loose on the shaft, in connection with the friction clutch member *q*. Both sprockets drive the main spindle through Renold silent chains. The ratio of these gears and sprockets is such that whichever the engagement of the clutch *j* the two drive the main spindle at the same speed, but in opposite directions. When the clutch is engaged at *q* transmission through gears *p* and *m* drives the sprocket *k*, and in turn sprocket *r* in the forward direction, and the sprocket *s* is driven by the sprocket *o* in the backward direction, both being slow speeds. When the clutch is engaged at the friction surface *t* then the drive is through the gears *n*, *l*, *m*, *p* to the sprocket *o*, which drives *s* in the backward direction, while *k* drives sprocket *r* in the forward direction, both at fast speed. The position of the clutch *u* determines the direction of revolution of the spindle. The entire machine is started and stopped by the hand lever controlling the clutch *b*. In addition a hand lever at

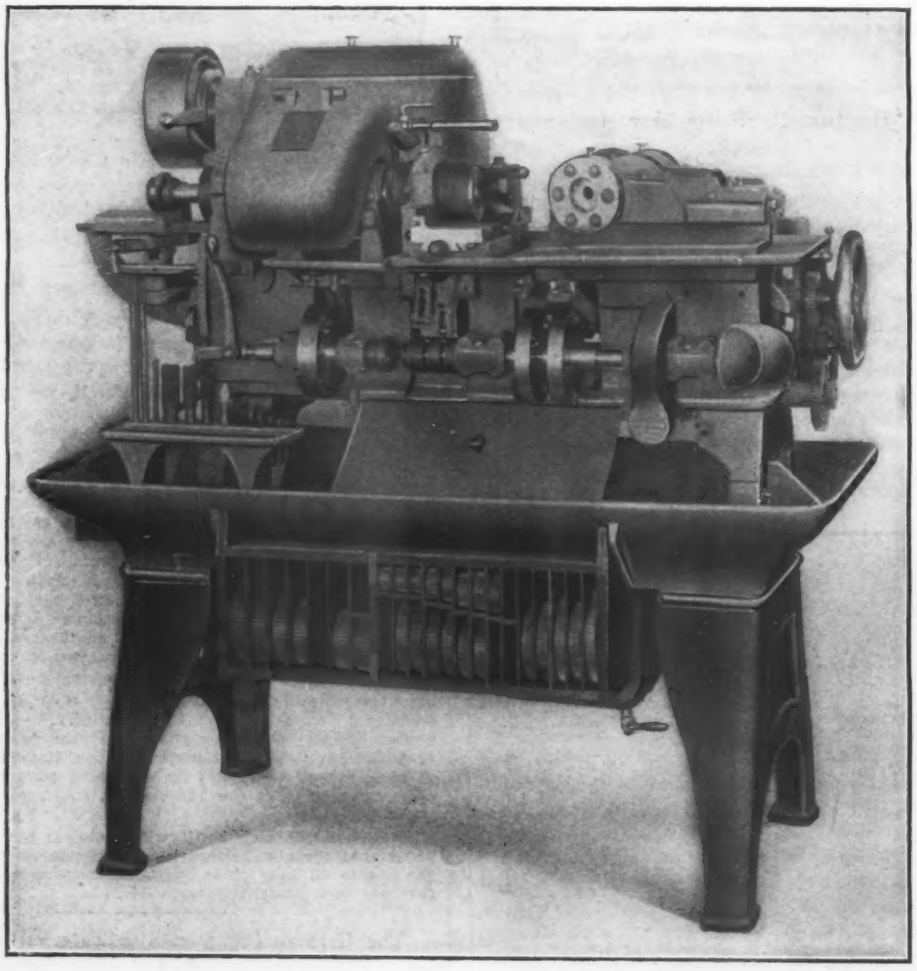


Fig. 1.—The New Constant Speed Drive Screw Machine Built by the Brown & Sharpe Mfg. Company, Providence, R. I.

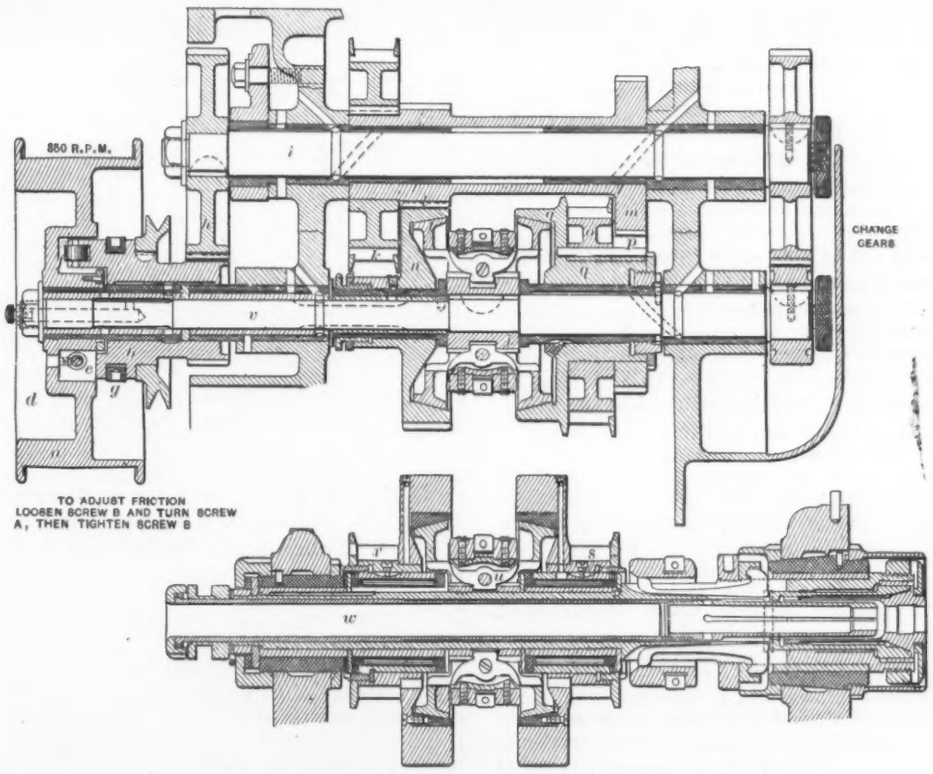


Fig. 2.—Sectional Views Showing the Details of the Drive.

the front immediately under the clutch lever starts and stops the feeds.

All movements of turret and cross slides are operated by one feed shaft located at the back of the machine. This shaft is geared to the spindle driving mechanism, which not only insures high efficiency, but also makes the speeds of both the spindle and the feed shaft positive, eliminating the possibility of accident to the mechanism from either the spindle or the feeds stopping while the other is running, all movements of the machine being dependent upon the spindle driving mechanism.

The turret revolves vertically on the side of its slide. The indexing of the turret, the operation of the chuck, the feeding of stock and the reversal of the spindle are controlled by quick running cams driven by shafts that maintain a constant speed, insuring rapid movements irrespective of the size of work. The operation of the cams is controlled by adjustable dogs, easy of access and of adjustment. The feeding mechanism is accurate, with fine and readily made adjustment, and can be stopped independently of the spindle. A scale on the feed lever, graduated to thirty-seconds of an inch or to millimeters, greatly facilitates the setting of the machine. The cross slide tools are on separate slides, operating together or singly. The tool posts have fine adjustment for the quick setting of tools. An automatic stop is provided for stopping the feeding mechanism independently of the spindle

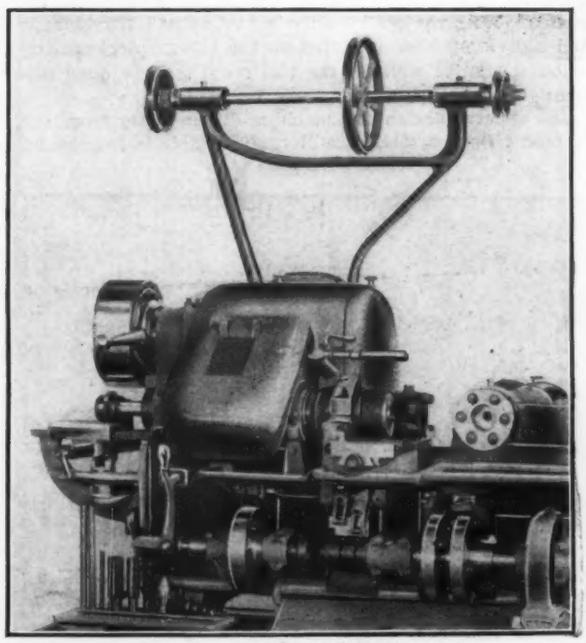


Fig. 4.—Attachment Driving Stand for the Brown & Sharpe Constant Speed Screw Machine.

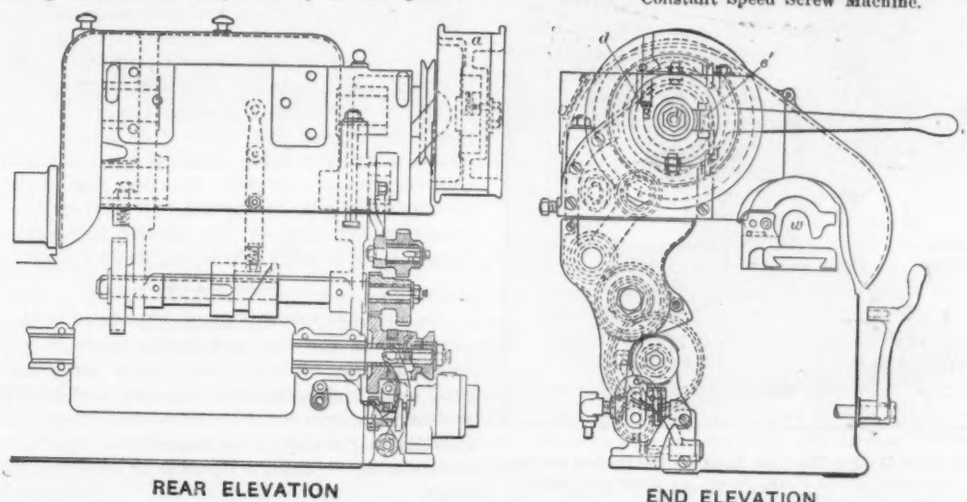


Fig. 3.—Rear and End Elevations of the Headstock, Showing the Driving Mechanism.

when the bar of stock is exhausted, leaving the chuck open for the new bar.

The hole through the largest feeding finger is ⅞ in.; special feeding fingers to take brass or other light work up to 1 in. can be furnished. The machine turns any length up to 2½ in. and feeds any length to 4 in. The change gears provide for making from 7 to 600 pieces per hour. The 9-in. driving pulley runs at a constant speed, 350 rev. per min., giving 12 changes of spindle speed in either direction, from 119 to 1216 rev. per min., in practically geometrical progression. The floor space required for the machine is 26 x 60 in. and its net weight is 2000 lb.

Figs. 4 and 5 show the new machine equipped with an attachment driving stand for driving such attachments as may be placed upon the machine for special operations, including slotting and drilling attachments.

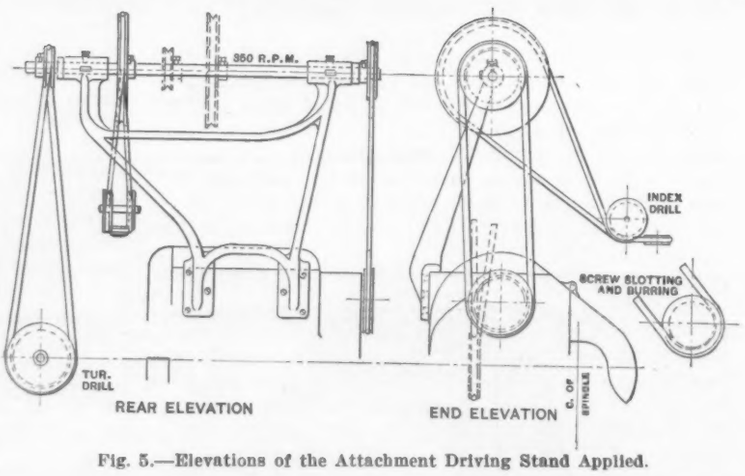
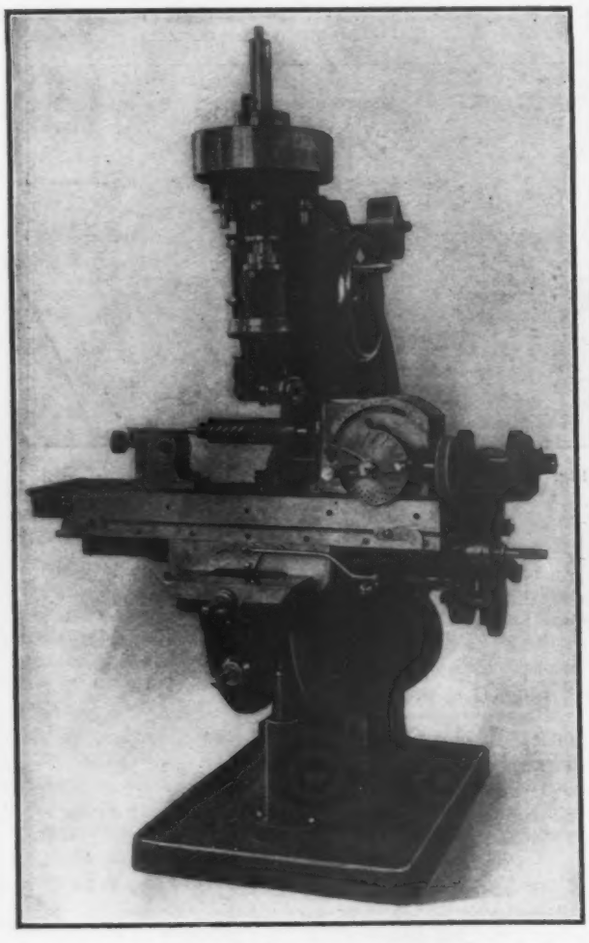


Fig. 5.—Elevations of the Attachment Driving Stand Applied.

The Becker Vertical Miller with Horizontal Attachment.

The Becker Milling Machine Company, Hyde Park, Mass., has arranged its No. 4 B vertical miller as a new type in that it is equipped for service as a universal machine, while still retaining the advantages of a vertical miller when it is desired to use it for slabbing or other work for which this class of tool is more specially intended. With the aid of a horizontal spindle attachment and a dividing head mounted on the table, spiral cutting or other similar work of the tool room may be done efficiently and economically.

In general design the machine differs little from the standard Becker vertical miller. The table is lengthened 10 in., and provision is made for a train of gearing to drive the dividing head. The horizontal spindle attachment is the same as that described in *The Iron Age* April 30, 1908. It can be attached or detached with little trouble. For spiral work the cutter is held in the central position of the horizontal spindle, as shown in the illustration, directly in line with the main spindle, which gives rigidity as well as convenience in centering. The horizontal spindle also takes a cutter at the end, secured by a draw-bar, thus making it an extremely versatile adjunct in certain classes of work.



The No. 4B Vertical Milling Machine Built by the Becker Milling Machine Company, Hyde Park, Mass., as Equipped with a Horizontal Milling Attachment.

The advantages of the arrangement, apart from the convenience of combining a vertical milling machine with universal features, are that the long saddle is retained, affording a rigid base for the work under all conditions, including the heavy duty of slabbing as a vertical machine; and that greater angles can be cut than with the ordinary universal type, as the head swings through a complete circle. The dividing head swings 10 in. and the distance between centers is 16 in.

While this machine may be useful in many shops, its most important field is in manufacturing establishments where it is an important economy to combine two types of milling machine in one. This is obtained without sacrifice, either in power, strength or solidity of construction.

The Future of Aluminum.—Commenting on a statement of the *Revue Polytechnique* that the situation in regard to aluminum is acute, and that consumption has fallen so low that it may be questioned whether manufacturers have not taken the wrong path by recommending the use of pure aluminum instead of aluminum alloys, London *Engineering* says: "We are not so pessimistic. When, a few years ago, the alloy of aluminum with 6 per cent. of copper for use for various naval purposes did not give the complete satisfaction that was expected of it, the aluminum then available had not the degree of purity which now obtains. Aluminum manufacturers then set to work to improve their methods of manufacture; they now produce aluminum of a high degree of purity, and they are quite as eager in recommending the use of this pure aluminum in alloys as its use alone for different engineering purposes. The saying of a French aluminum manufacturer to the effect that 'the future of aluminum lies upon the water,' is more true now than it ever has been. Seeing also the very great efforts which are being made at the present time in the construction of dirigible balloons and aeroplanes, its future is likely to be further extended still, while in the numerous branches of the electric industry the use of aluminum is steadily developing day by day."

The Upson Nut Company, Cleveland, Ohio, is getting estimates on the cost of building three open hearth furnaces, a 34-in. blooming mill and a bar mill. The company owns and operates a large nut and bolt factory and a blast furnace, near which the steel plant could be built, enabling hot metal to be taken from the furnace to the steel works. A definite decision to build has not yet been made.

A New Sturtevant Motor.

Particularly for the driving of fans, the B. F. Sturtevant Company, Hyde Park, Mass., has developed a new line of four-pole electric motors. One of them applied to this service is shown in Fig. 1. These motors, designated as type H, are also suitable, however, for general work, such as operating machine tools. Although the motors are claimed to be as efficient as any of the same size and speed, they are conservatively rated so that a sudden increase of load may not injure the motor. They will carry 50 per cent. overload for one hour and 100 per cent. overload for 5 minutes without destructive sparking or heating. By a special design of armature abundant ventilation is secured, the air currents flowing in and out of the motor, as indicated in the sectional view, Fig. 2. The heat rise is always low; tests conducted in clean, dry places show it to be less than 40 degrees C. at normal speed and output. The motors are made in sizes ranging from 1 to 100 hp., the speed varying from 425 to 1600 rev. per min.

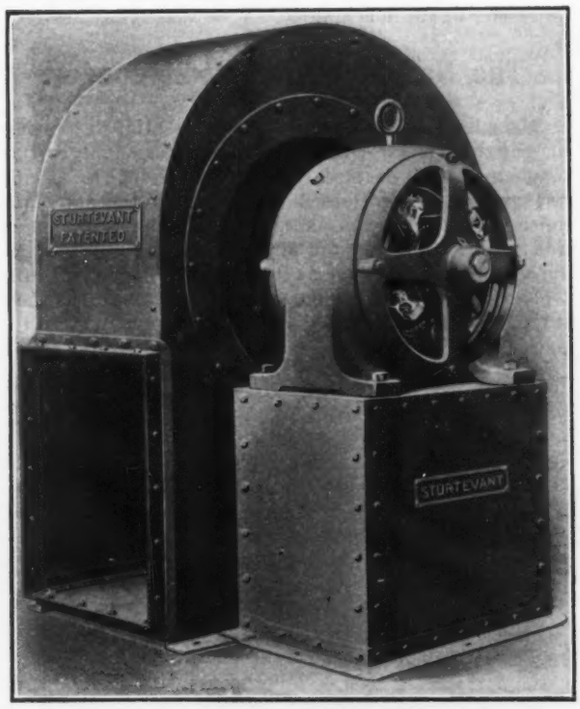


Fig. 1.—A Sturtevant Electric Fan Equipped with a Type H Motor.

The unassembled parts of the motor appear in Fig. 3. The armature is of the iron clad, slotted drum type, built up of soft annealed sheet steel punchings, insulated from each other and assembled on a cast iron sleeve. The sleeve is provided with openings for the circulation of air, and has an extended hub to receive the commutator shell. The commutator with the armature is a self-contained unit. The bars are of hard drawn copper, insulated with mica, and are held in a cast iron shell of spider construction. The bands which insulate the segments from the clamping rings are of mica, and to securely hold all bars in place, the entire commutator is assembled while hot under great pressure.

The carbon brushes are held in brush holders, which are supported by a spider ring, which in turn is supported in a recess machined in the magnet frame. The ring is clamped in position by the bearing bracket, and while it may be shifted easily the brushes cannot be thrown out of position or tilted, as is likely when the brush rigging is clamped by set screws. The brush holder, body and springs carry no current, braided copper cable shunts or pig tails being provided for this purpose.

The magnet frame is a cylindrical yoke of cast iron of high permeability, machined on each end to receive the bearing brackets, and on the inside to provide seats for the pole pieces which are through bolted to the frame. The supporting feet of the motor are cast solid with the frame. The pole pieces are located off center with re-

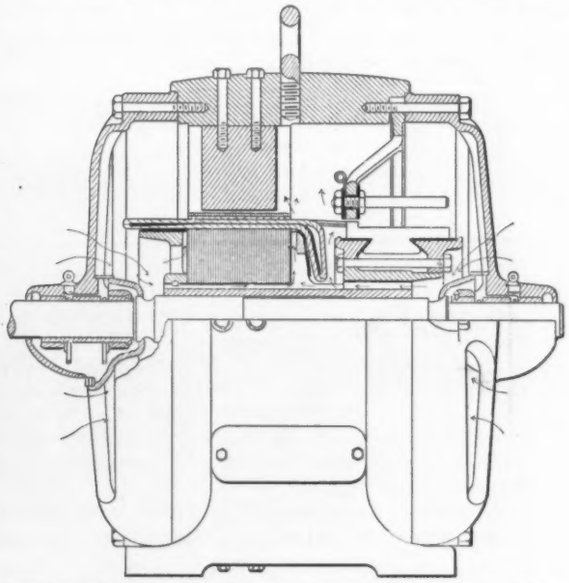


Fig. 2.—Sectional View of the Motor, Showing the Provision for Ventilating Air Currents.

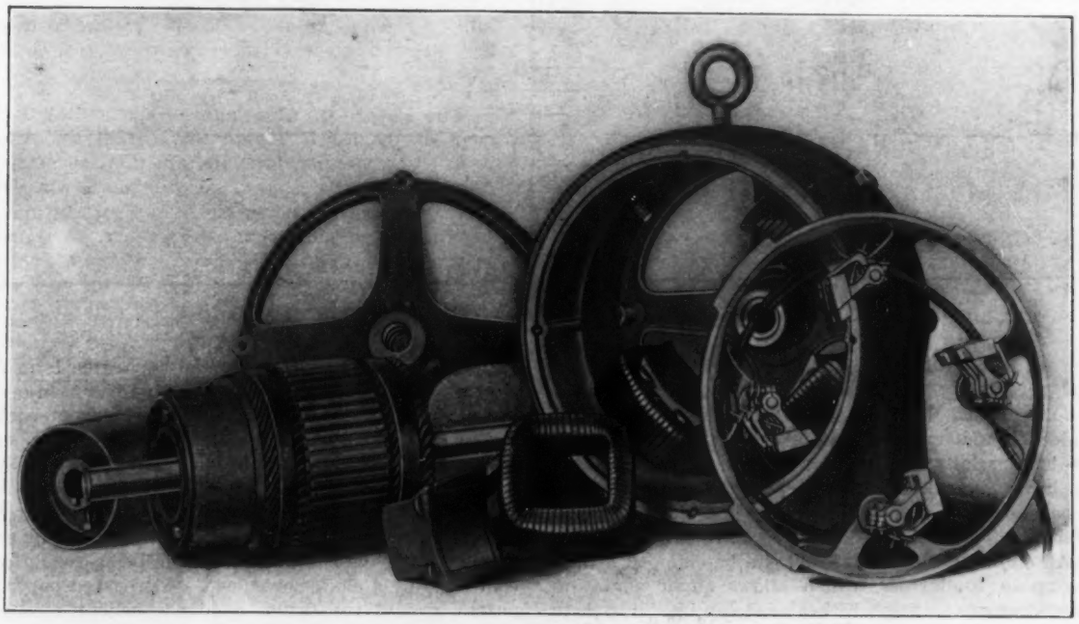


Fig. 3.—The Parts of the Sturtevant Type H Motor Unassembled.

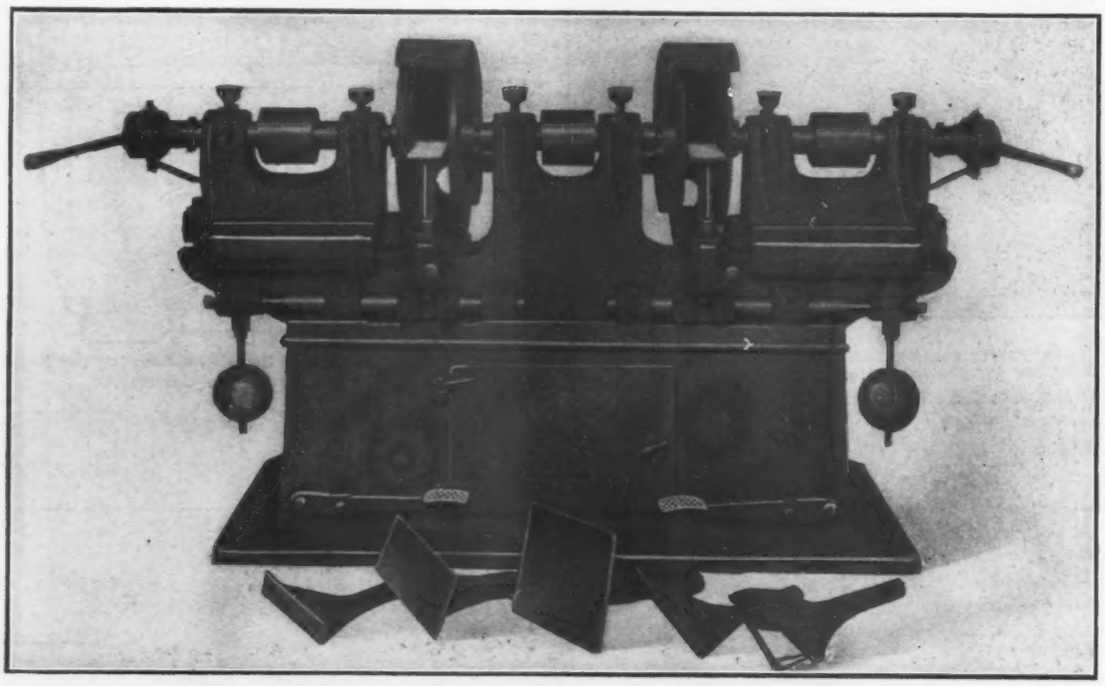
spect to the frame, permitting the use of duplicate bearing brackets on either end. The bearing brackets are of skeleton construction, and are clamped into seats in the magnet frame by four equally spaced bolts, so that the motor may be arranged for floor, wall or ceiling suspension without further machine work.

The pole pieces are assembled of soft steel punchings, riveted together between end plates while under pressure. The punchings are formed to provide a support for the field coil and distribute the magnetic flux so as to produce sparkless commutation under wide variations of load. The pole pieces are bolted to the frame by hexagon head tap bolts, which pass through the frame and are threaded directly into the pole pieces. By removing the bolts a pole piece with its field coil may be removed without removing the armature or dismantling the motor.

The field coils are machine wound of double cotton covered copper wire of high conductivity, and are insulated and held together by two layers of heavy tape. The coils are thoroughly insulated and protected, both against moisture and mechanical injury.

The No. 6 K 4 Gorton Grinder.

Two double disk grinders are combined in a single machine in the No. 6 K 4 Gorton grinder, built by the Diamond Machine Company, Providence, R. I., and illustrated herewith. The result is a saving in space, belting, countershaft and power, and the elimination of a considerable amount of handling of the work. The machine is especially adapted for grinding in two stages, work having parallel sides or sides at a slight angle. One pair of disks does the roughing and the other pair the finishing. In this case two operators are necessary.



The No. 6 K 4 Gorton Grinder with Four Disks and Two Swivel Heads, Built by the Diamond Machine Company, Providence, R. I.

Both sliding tables swivel and can be clamped at any angle up to 10 degrees, which allows slight angles to be ground at one setting. Either head can be slid back to accommodate work of any length up to 12 in., or may be removed entirely to convert one side of the machine into a single end grinder. The disks can be advanced by hand or by foot power, or by both at once. The foot power arrangement can be left off if necessary, but it does not interfere with the regular hand operating device. The tables are counterweighted.

The hight from the floor to the center of the spindle is 40 in. and the size of the base 27 x 69 in. For the feed there is a micrometer adjustment reading to 0.001 in. The regular equipment of the machine includes eight 18-in. steel disks, 24 assorted emery circles, one disk cutter, one cementing press, three steel wrenches, two dust exhaust hoods, eight work tables, and one double drum countershaft intended to run at 540 rev. per min. At this speed the spindles revolve at 1800 rev. per min. The net weight of the machine with the accessories as mentioned is 3200 lb.

While the machine was originally designed and is shown as a regular disk grinder, chucks with emery rings may be used so that heavy grinding may be done, and if it is necessary one set of chucks can be used on one end of the machine for doing roughing work, and the finishing can be done between a pair of disks at the other end of the machine.

The National Machine Recorder.

Knowledge of production costs is essential to economy in manufacturing. Under systems in vogue the cost of producing a given piece of machine work is usually reckoned from the elapsed time between the start and finish of the operation as reported by the workman or timekeeper. This does not always take into account time unnecessarily wasted during the process. To mechanically register the time in action of every machine in a shop, the device here illustrated has been brought out by the National Machine Recorder Company, Marquette Building, Chicago. The purpose of the apparatus is to record the actual length of time each machine has been occupied in producing, the duration and time of day of each producing period in hours and minutes, every inoperative moment, and when and how long any given machine remained idle.

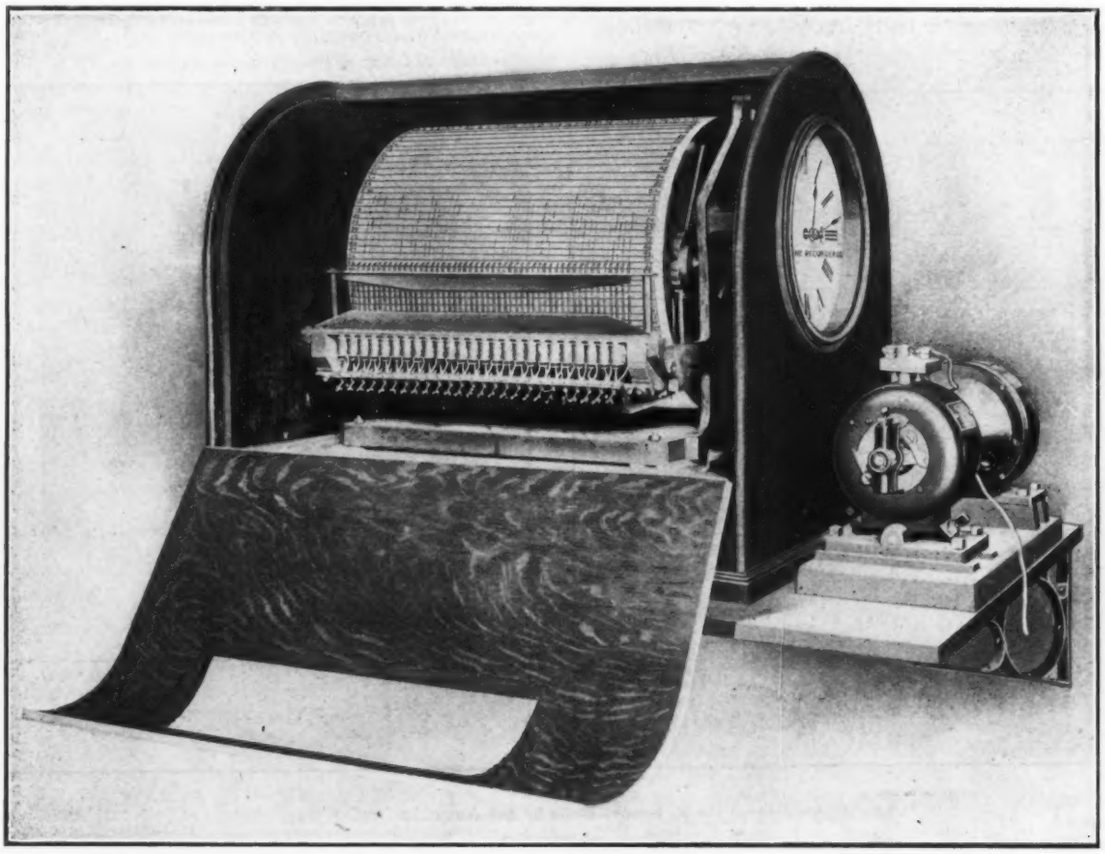
The recording mechanism consists of a drum rotating on a shaft in an inclosed case, and is actuated by a large motor spring, the speed of the drum being regulated and controlled by a clock movement. A prepared paper chart passes around the drum, and independent records are imprinted upon it by energizing electro magnets the armatures of which carry brass points. Each point is brought in contact with the paper when the corresponding machine is started, and is retracted by a small spring when the electric circuit is broken by stopping of the machine. A small generator set is commonly used to energize the recording magnets, although if desired the necessary current may be supplied by battery cells. The chart is about 46 in. long by 17 in. wide, and is divided horizontally into minute spaces for a period of 12 hr., 7 a.m. to 7 p.m. A heavier line marks the five-minute intervals and double lines separate the hours. The width

of the paper gives space for the records of 50 machines. The chart is printed on what is known as metallic paper, a prepared paper on the surface of which a line resembling a pencil line is marked with a brass or silver point.

Each machine is connected with the recorder by a wire circuit having a contact attached to the starting and stopping lever controlling the working movement of the machine. Attaching the contact to the belt shifting lever or other starting device would in all cases shown on the chart the frequency and length of stops; but to obtain a reliable record of the performance of work the record must distinguish between the idle and producing movements of the machine. To accomplish this the contact may be attached to the feed control, so that the recorder will register only when the feed is thrown in and work is actually being done. If the contact were connected with a belt shifting lever it might be possible to defeat the accuracy of the record as showing the actual amount of work done by permitting the tool to run without the feed being thrown in. It is possible to make contact connection with feed controlling levers or devices of nearly all tools, but in actual practice this is not ordinarily done, since the check afforded by the number of pieces produced, together with the accurate time records shown on the chart, make deception practically impossible.

The contact device performs the function of a push button or switch. One of the simplest forms of applying a contact to a countershaft, for example, is to attach two leaf springs to some part of the countershaft frame, so that the rod carrying the shifting forks will be entered between them and make contact with each. The spring leaves are insulated from one another, and the two wires from the recorder are led to these springs. Operating the countershaft in the direction that places the belt on the tight pulley introduces the shifter rod between the springs and closes the electric circuit with the corresponding electro magnet in the recorder. Almost an endless variety of devices for the purpose may be conceived of for connection with either the feed or the driving mechanism of any machine. Many of the standard forms of circuit closing apparatus which are now on the market can be readily adapted to the purpose.

Since the chart exhibits the exact time consumed in making each cut it can also be seen at a glance whether the operator is making proper use of the variable speeds of his machine. If the speed changes are neglected the record will make it clearly apparent that roughing and finishing cuts have been taken at equal speeds. Neglect in this respect whether the result of carelessness or prompted by a definite purpose to extend the time limits of an operation is equally effective in decreasing the shop output. While such practices would probably be eventually detected by any competent system of supervision, it is especially emphasized as an important feature of this record that information of irregularities of this and other kinds is immediately supplied, making it possible to stop the leak at its inception without waiting for an accumulated loss to demonstrate its existence. In the interest of both employer and operator it is desirable to establish equitable time limits for the performance of each operation, and to this end the detailed registry of each moment of running and idle time of every machine in a plant is obviously advantageous.



An Instrument for Recording the Working Time of Machinery, Made by the National Machine Recorder Company, Chicago, Ill.

The recorder is installed in the superintendent's or manager's office, where the chart may be scrutinized and the progress of work in any part of the shop observed at any time. While only 50 machines can be connected with the recorder at one time, it is possible by means of a switchboard to connect up any number of machines which may be switched on and off alternately as desired. The presence of an authentic record, such as is produced by this machine, is, it is claimed, particularly effective in starting machinery on time in the morning and in keeping it going until the proper closing hour. It is designed for attachment to machines used in various kinds of manufacturing plants where for the perfection of shop systems it is desirable to have exact automatic records of time limits in productive capacity of machinery.

The case containing the recorder is approximately 30 in. long, 18 in. wide and 20 in. high, and is provided with a glass covered opening through which the readings are observed.

A New American 15-In. Shaper.

In the new 15-in. single geared crank shaper illustrated herewith and built by the American Tool Works Company, Cincinnati, Ohio, the most severe requirements of modern shaper work have been allowed for. The machine is especially claimed to be a rapid and accurate work producer, and one that is durable and maintains its alignments.

The column is unusually deep and wide, tapering slightly toward the top, and projects both front and rear at the top, providing an exceptionally long bearing for the ram. It is strongly braced internally and is reinforced inside, on the line of strain, affording exceptional rigidity. The base is large, deep and strongly ribbed, and is of pan construction to catch oil drippings.

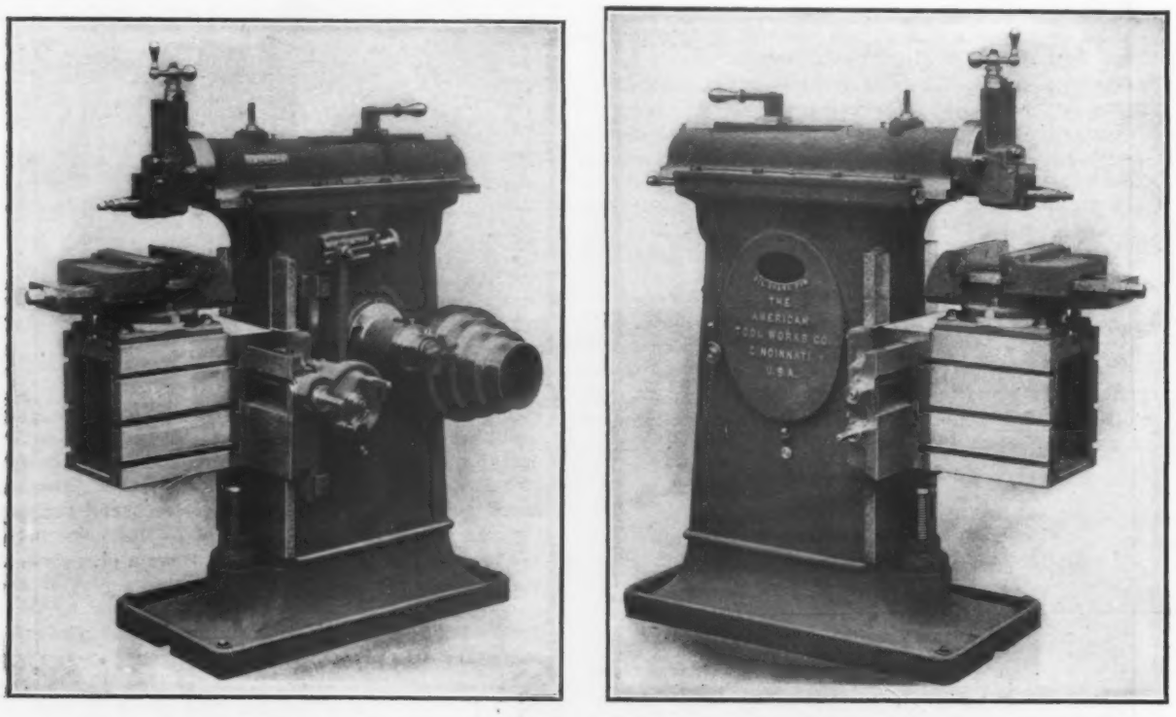
The ram is very heavy and is designed for uniform rigidity throughout its length of stroke. It also is braced by internal ribs, and has long wide bearings on the column with a continuous taper gib having end screw adjustment for taking up the wear. The stroke of the ram is positive and has four rates of speed, ranging from 20 to 65 strokes per minute. The length of stroke may be easily changed without stopping the machine, and is indicated by a pointer on the ram traveling along an index. For positioning the stroke a device is located on the ram near the head, and this also may be operated while the machine is running. The rocker arm is extra heavy and thoroughly braced, and gives to the ram a nearly uniform speed its entire stroke and also provides an exceedingly quick return. The gearing ratio and wide belts are calculated to furnish sufficient power for all work adapted to this type of machine.

The head is operative at any angle within an arc of 100 degrees, and has a convenient and efficient locking device. For taking up the wear the down slide is fitted with a continuous taper gib having end screw adjustment. An unusually long down feed is afforded through a screw having an adjustable graduated collar reading to 0.001 in. The head has a large tool post for using holders with inserted cutters, and has a tool steel post screw and a tool steel serrated back plate.

The table is of box form, with three T slots on both the top and sides, cut from the solid. It is braced internally and is readily detachable. The apron is fitted to the cross rail against very wide bearings, and is provided with a continuous taper gib having end screw adjustments for taking up wear. It has three T slots on the face for clamping work when the table is removed.

The cross rail also is of box form, heavy and strongly ribbed. Its length gives the table a long horizontal travel. Clamps and bolts of improved design secure it to the column, which prevent it from dropping away when the binder bolts are loosened. A telescopic elevating screw of large diameter is provided having ball bearing thrust. The elevating gears are of steel, planed from the solid.

The cross feed is of the company's new patented design. It is variable and automatic, with a range of 0.008 to 0.2 in., alterable while the machine is running, through the slot head near the top of the column, operated by the knurled knob shown. A scale and pointer show the number of notches (1 to 25) turned at each stroke, each notch representing a feed of 0.008 in. The construction is such as to render unnecessary any adjustment of feeding mechanism due to changing the position of the rail, the feed being constant regardless of the rail position. The feed is thrown in or out or reversed through the knob on the large feed gear. This gear has a square crank hold, used to obtain quick advance or return of the table. The feed gears are protected and the feed rack is cut from bar steel. An automatic stop releases the feed, preventing injury by excessive feed or accidentally feeding the apron to either limit on the rail.



Two Sides of the 15-In. Single Geared Crank Shaper Built by the American Tool Works Company, Cincinnati, Ohio.

The rocker arm is bifurcated at the top and the column has a large opening to permit keyseating a shaft 2½ in. in diameter. Larger shafts may be keyseated by setting the table over to allow the shaft to pass outside of the column and inclining the head to that side.

The vise is of a new and heavier design, with deep jaws faced with steel. It is clamped by two bolts to a large swivel base (graduated in degrees), covering nearly the entire area of the table top to which it is clamped by four bolts. The vise screw has bearing on both ends and is always in tension when holding the work.

All working parts are thoroughly lubricated. The ram slides have felt wipers at both the front and center of column, assisting lubrication and preventing oil from dripping down over the front of the machine. An oil pocket is cast integral with the column at the rear, storing any waste of oil, which may be drawn off at any time through a pipe extending from the rear of the column. A large quantity of oil is stored in a pocket cast integral with the arm, from which it is distributed to the crank pin and the sliding block in the rocker arm.

The countershaft has tight and loose pulleys 12 in. in diameter by 3¼-in. face, and is intended to run at 180 rev. per min.

The bearing for the driving pulley is cast integral with the column and is exceptionally long, extending well into the center of the cone, eliminating the necessity of an outboard bearing for the cone shaft. This bearing is bronze bushed. All shafts are of high carbon crucible steel, ground. All gears are of coarse pitch and wide face, and are cut from the solid.

This shaper is claimed to be remarkably smooth in its action even under the heaviest cuts. In planing work which is afterward to be scraped much unnecessary scraping is avoided because of the accuracy and evenness of the cut. As giving some idea of the power of the machine, it is stated that in tests on cast iron it took cuts 4 in. long, ⅜ in. deep with 0.016-in. feed, ⅛ in. deep with 0.04-in. feed and ⅛ in. deep with 0.048-in. feed, with the belt on the next to largest cone pulley step, and cuts 12 in. long ⅛ in. deep with 0.024-in. feed, with the belt on the largest step. On steel cuts 2½ in. long ⅛ in. deep with 0.016-in. feed were taken with next to slowest speed, and cuts 10 in. long ⅛ in. deep, with 0.016-in. feed at the slowest speed.

The length of stroke of this machine is 15¼ in., the down feed to the head 6 in., the vertical travel of the table 14 in. and the horizontal travel of the table 18 in. The regular equipment includes a vise, countershaft, wrenches and the automatic safety stop. In addition there can be furnished an automatic stop dog for the cross rail to stop the feed at any point, a circular attachment, mold makers' vise, tilting table, four-speed gear box and electric motor drive.

The Baird Steam Drying Barrel.

For drying small parts of wire or sheet metal with hot sawdust after they have been subjected to a wet tumbling or a plating process, the Baird Machine Company, Oakville, Conn., has brought out a new drying-out barrel, shown in Fig. 1. The operation of the machine is similar to that of the No. 2 Baird oblique tilting tumbler. Work can be put in or dumped or examined while the barrel is in operation, and the barrel may be tilted to any angle while rotating. The purpose is to provide a method of drying that is quicker and cheaper than the hand process, in which a small batch of parts is placed in a steam drying pan, heated from beneath by steam coils. The capacity of the barrel is greater, and the further advantage is claimed that the operation of tumbling not only thoroughly dries the product, but the sawdust as well, thus shortening the time of drying for the next charge. Yet another result is that tumbling in sawdust brings parts to a brighter finish. In this machine the difficulty of getting rid of the water of evaporation has been overcome, the action being entirely automatic.

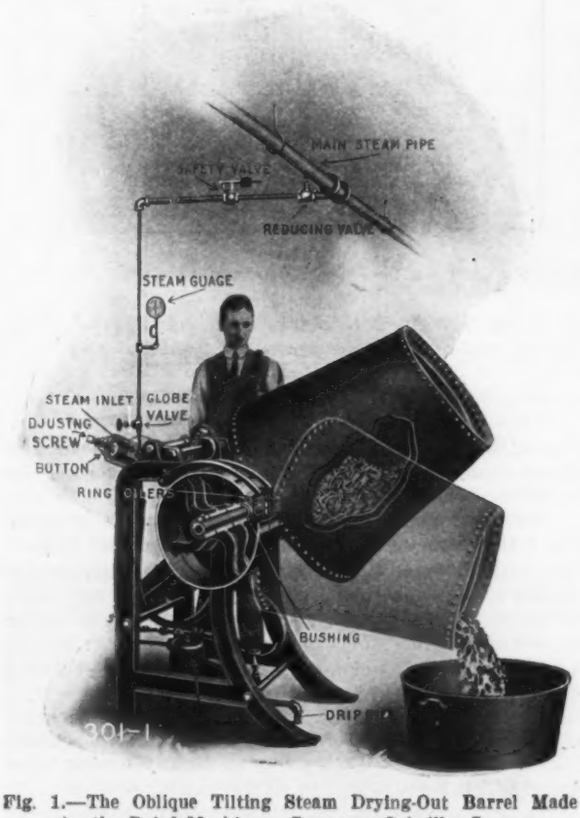


Fig. 1.—The Oblique Tilting Steam Drying-Out Barrel Made by the Baird Machinery Company, Oakville, Conn.

In general design the machine is very similar to the company's standard tilting tumbler described in *The Iron Age* January 18, 1906. The new feature is the arrangement for introducing steam to the space between the inner and outer shells of the barrel, including the cylindrical wall and the head. As shown in Fig. 2, the shaft to which the barrel is attached and which causes it to rotate has two passages running through it lengthwise, one admitting live steam to the barrel casing, the other carrying away the exhaust. Surrounding the shaft are two steam boxes, which are held against rotation. The steam enters the steam box nearer the barrel and passes through one of the shaft-passages to the space between the barrel shells. The barrel head has a port connecting the steam space with a pocket forming a part of an exhaust passage which enters the second opening through the shaft leading to the exhaust steam box. The exhaust steam and water is expelled by the steam pressure behind it and assisted by gravity. When the port is in the lowest position the water of condensation flows through it to the pocket, and when the pocket gets to its upper position the water empties through the passage to the steam box and thence, with the exhaust steam, through a steam trap. It will be seen that this action is entirely automatic and makes it easy to maintain a constant high temperature in the barrel. Where the steam pressure available exceeds 20 lb. a reducing valve is employed.

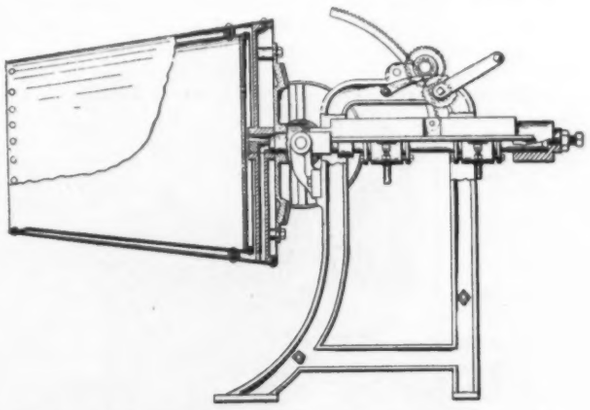


Fig. 2.—Sectional View of the Baird Steam Drying Barrel.

The inside dimensions of the barrel are: bottom, 28 in.; top, 21½ in., and length, 26 in. The speed of the barrel is from 35 to 40 rev. per min., as required. The floor space is 42 x 60 in., and net weight 1200 lb.

The Roe Mechanical Puddler.—The mechanical puddler invented by James P. Roe, Pottstown, Pa., is now being operated at the works of the Glasgow Iron Company by the Reading Iron Company, in order to gather further general data, and specifically to develop the use of gas in place of oil as a fuel, all the runs thus far having been made with the latter. While successful metallurgically, oil was too uncertain in supply, and there was the prospect that producer gas may be cheaper. Mr. Roe has introduced some novel features of gas application.

No. 2 furnace of the Warwick Iron & Steel Company, at Pottstown, Pa., was blown in September 24 with dry air. No. 1 furnace is giving better results than have ever before been attained so far as tonnage, control of the grade and fuel consumption are concerned.

The New Landis All-Steel Die Head.

The bolt cutter illustrated in Fig. 1, and especially its die head shown in Fig. 2, have been designed for producing accurate work rapidly. The flexible rake provided in the die, accommodates it to the cutting of various kinds of material. These machines are built by the Landis Machine Company, Waynesboro, Pa., in single, double or triple head patterns, with either belt or motor drive, and the same type of die is also used in the company's pipe threading machines.

The head is made entirely of steel, the heavier parts being made from cast steel, the spindles from machinery steel, and the smaller parts from tool steel. All the main bearing parts are hardened and ground and are interchangeable. The die head is symmetrical, compact, and all parts are easily accessible. The die locks within the head and the yoke is not relied upon to hold the die closed while cutting or for carrying any of the cutting strain; in fact, the yoke plays freely and is not locked at all. For this reason it may easily be attached to other makes of machines, and requires less attention in the way of adjusting than the average die head.

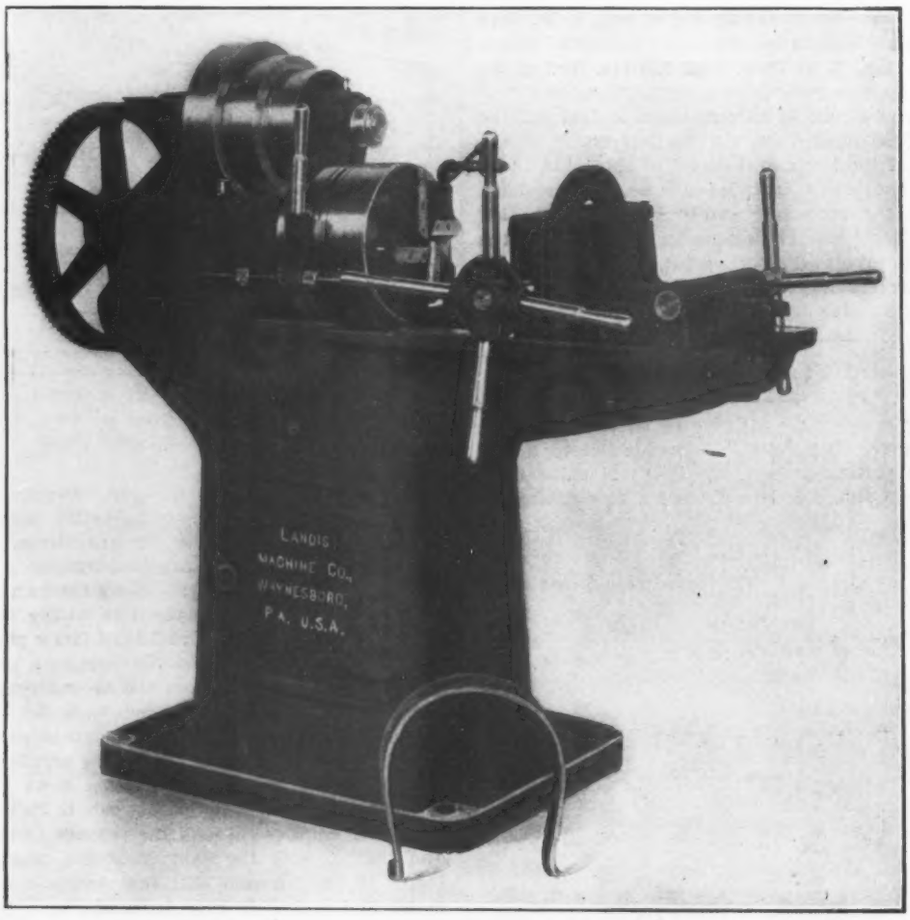


Fig. 1.—A Single Head Bolt Cutter Built by the Landis Machine Company, Waynesboro, Pa., and Equipped with the All-Steel Head.

Fig. 3, a cross section of the head, shows a section on A O B passing through one of the spindles *a*, to which the chaser holder is clamped and which carries the greater part of the cutting strain. These spindles are ground and have very long bearings. The same section shows one of the large cone pins *b* which move longitudinally with the ring *c* and work in hardened bushings in the ring *d* to rotate the latter, which opens and closes the die. The spring *e* engages the chaser holders and gives quick and positive opening to the die and takes up the back lash that might occur from slight wear. This spring is made with one coil, so as to give it a uniform tension in its different positions.

As shown in the detail of the locking device, to open the head, ring *f* moves back raising the locking latches from behind their hardened seats when the springs quickly open the die. When the die is closed it is positively locked and there is no possible strain on the yoke. The tangent adjusting screw engages the head body proper and is located in ring *g*. Graduations on the rear of the head determine setting positions for different diameters. The spindle *h* of the machine is fitted rigidly into the head, avoiding any possibility of the head working loose from the spindle.

The vertical pin in the locking device with the angle head drops in behind a hardened plate, and is held there by a flat spring in ring, *f*. In opening, the ring carrying the horizontal pin starts to move back, raising the vertical pin until it unhooks behind the hardened plate and the die quickly opens. There are two of these locking pins located on opposite sides of the head. The spindle *a* acts only as a support to carry the cutting strain of the die. The die is opened and closed by actuating ring, *d*. This ring is, in turn, operated by the cone pins *b*, one being located on each side of the head. When this ring rotates, the sliding shoe in the chaser holder moves the chaser holder back or forth at its periphery, causing the die to open and close from a central point.

The holders carrying the dies are also made of steel. Fig. 4 shows one of these holders with the chaser in position, and the small hook gauge used for determining the correct cutting position of the chasers after they have been ground. The chaser is supported close to the cutting point, and is backed so as to prevent its canting or becoming bell mouthed. A clamping bar engages the dovetailed slot in the back of the chaser shown in Fig. 5 in such a manner as to draw it down and back at the same time by means of the two screws on the face of the chaser holder. The chaser is also supported on the rear by a screw, which helps hold it in correct cutting position. By means of this screw the chaser can be set forward as fast as worn or ground off.

Any rake can be given the dies in grinding that may be desired to suit the kind of material it is desired to cut, and may readily be made such as to produce a rolling chip after the manner of a lathe tool. This flexible

rake makes it easy to employ the highest possible cutting speeds that can be had from any die, as the cutting clearance in the die is correct, and there is no drag in the die. The bevel on the chaser, as shown in Fig. 5, forms the throat of the die, and no grinding is ever done on this bevel. The depth of the throat can be made to suit special requirements, where it is necessary to cut close to shoulders or heads of bolts, and it will be possible to cut just as close to shoulder when the die is almost worn out as when it is new since the throat is never ground. The chasers are hard their entire length, and to resharpen means simply grinding the ends of the chasers. One set of dies can be ground very many times before they are too short to hold.

As these dies never require annealing, hobbing or retempering, they can be made to advantage from high speed steel, and eliminate much of the annoyance common in the hobbed die. They are claimed to have a life far in excess of any other. Another feature of especial value in this die is that the back teeth of the four chasers cannot shave the thread, but act as a lead nut to draw the work in to the correct pitch of the die. If required special dies are furnished with a fine degree of accuracy guaranteed.

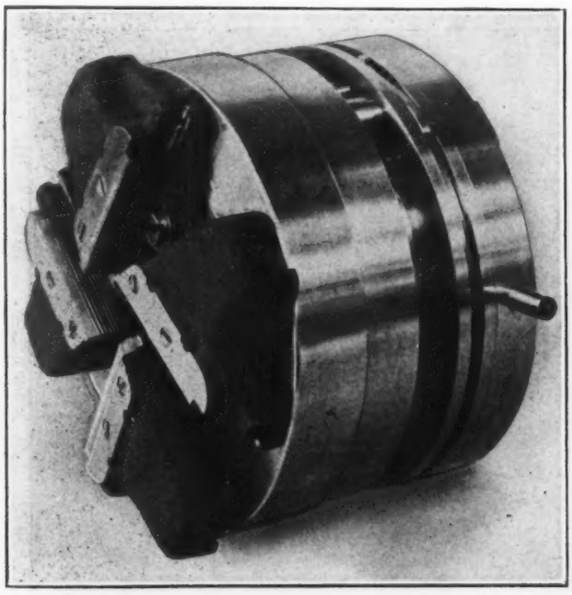


Fig. 2.—The Landis All-Steel Die Head.

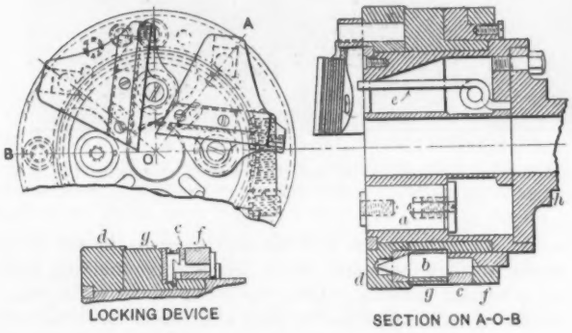


Fig. 3.—Details of the Head.

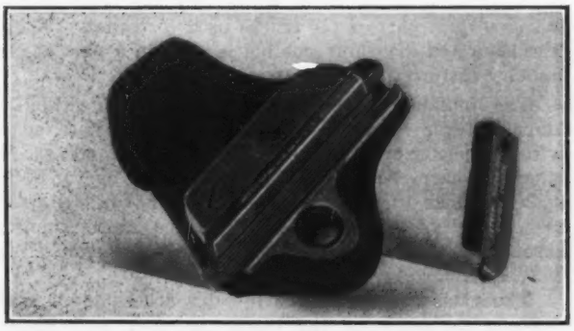


Fig. 4.—One of the Chaser Holders and the Setting Gauge.

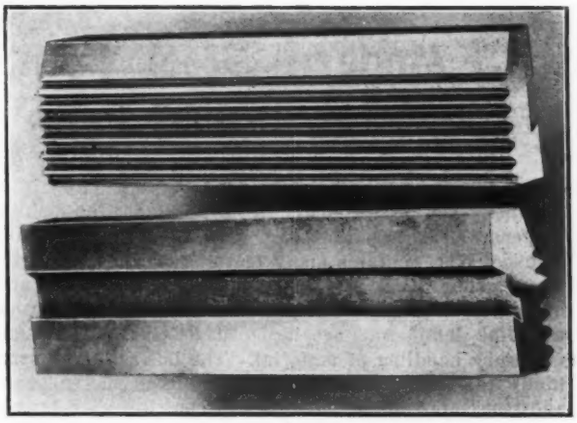


Fig. 5.—Two Chasers, Showing Front and Back.

With this die it is stated that cutting speeds have been attained more than 100 per cent. faster than with the ordinary hobbed die, due to the die having correct cutting clearance, flexible rake and no drag, giving ideal cutting conditions.

The die is opened and closed in much the same manner as in all ordinary bolt cutters, either by hand or by the movement of the carriage. The carriage has the advantages of adjustment either up or down or sidewise. It is gibbed to the bed, so that it can be readily adjusted to compensate for wear. The vise has guides symmetrically placed with relation to the bolt being cut, and clamping screws immediately below, thus eliminating side thrust. The rack is in the center of the machine, beneath and in line with the bolt being threaded, and the grips provided with the machine can be turned four ways for holding different sizes or shapes of stock.

The main spindle of the machine is so arranged that any oil running in through the head cannot run out on the floor in the rear, but will pass back into the oil tank again. All machines are provided with rotary oil pumps, with spring release valves.

When desired tap chucks can be put on the heads in place of dies to form chucks for holding taps, and one set of chucks will cover the entire range of the machine and can be adjusted in the same manner as the head is adjusted, and the dies set to different sizes. It is not necessary to stop the machine to take a nut tap out or put one in again.

The International Nut Company, Niagara Falls, N. Y., has just been organized and will soon be incorporated. R. A. Ellis, formerly secretary of the Boston Bolt Company, will be president of the new company. N. Chambers, who for the past four years has been superintendent of the Fairbanks-Morse Company's Toronto plant, will be general manager, and E. D. Cleghorn, who has been engaged in the manufacture of automatic screw machines in England, will be vice-president. These three are the prime movers in the new organization. They have already purchased the plant of the American Nut Company and are having plans prepared for an additional manufacturing building 70 x 70 ft. two stories, on which construction will soon be started. The company will engage in the manufacture of nickeled and brass plated nuts, which will be made direct from the bar and cut, drilled and threaded by its own special process. The product will be sold to the automobile manufacturing trade and other manufacturers requiring high grade nuts. Contract for the special machinery has been awarded. Electric power will be used, and the company is now in the market for prices on three 15-hp. motors.

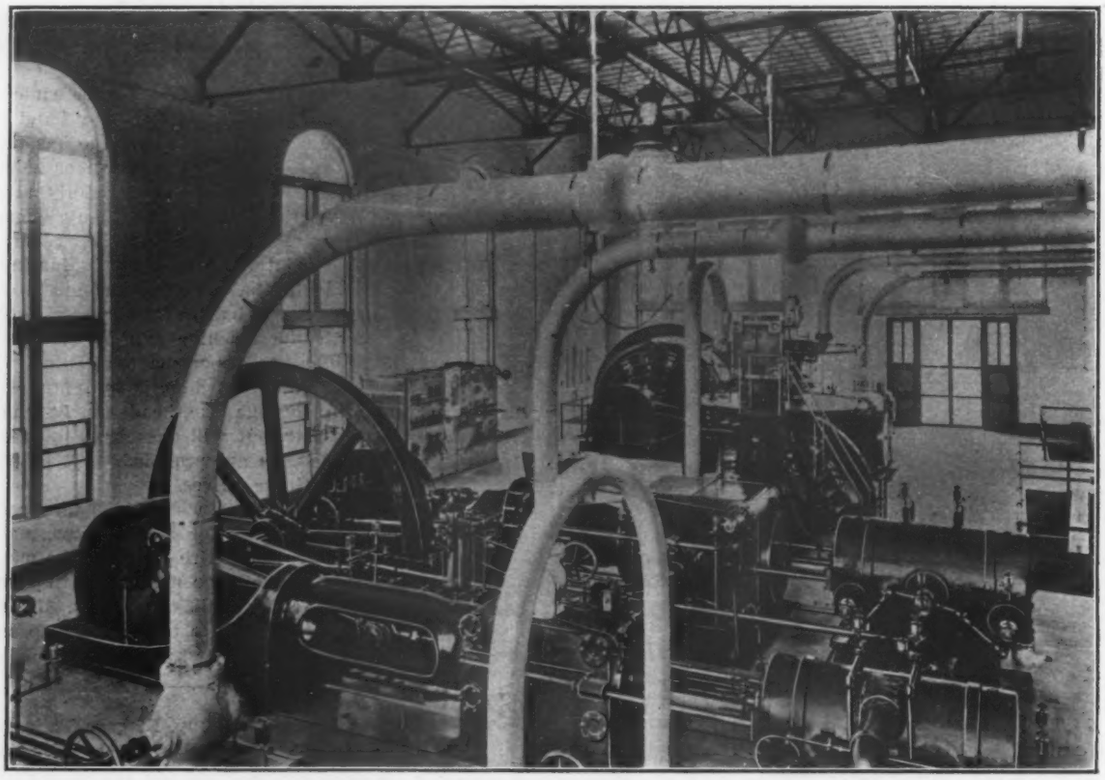
Since the last annual meeting of the American Society for Testing Materials at Atlantic City in June, the membership has increased by 56, making the present total 1069.

A Modern Steel Foundry and Machine Shop.

The Falk Company's Plant, Milwaukee, Wis.

BY C. A. TUPPER.

The largest steel foundry in the West, for the making of general castings, that of the Falk Company at Milwaukee, Wis., contains many features of interest. Principal among them is the economical arrangement and operation of the works, which are complete in every essential detail, and are designed to eliminate all unnecessary handling of material. The business was originally the manufacture of street railroad motor gears and track appliances, and this still constitutes an important branch. The present foundry is a brick and steel building, 625 ft. long by 295 ft. wide at its largest part, having a capacity of 1500 tons monthly, where steel castings are turned out, weighing up to 40 tons or more and varying widely in character. The following description begins with the unloading of the raw material and covers the work, step by step, through the various processes by which it progresses to the finished casting.



View in the Power Plant of the Falk Company, Milwaukee, Wis.—Two-Stage Compressor in the Foreground, Generator Units in the Background.

The Foundry.

Pig iron, brought in over the Chicago, Milwaukee & St. Paul Railroad and left in cars on the tracks which occupy a considerable portion of the ground, is unloaded by a Cutler-Hammer 2-ton lifting magnet, handled by a locomotive crane, and is placed in piles between the tracks. An average analysis of each pile of pig iron or scrap is then taken, and the magnet is again used to load the iron directly into charging buckets carried on small trucks, which, after passing over a scale and having the weight and contents of the buckets recorded, are drawn up an incline to the charging floor of the furnaces and there lined up on tracks. Thence they are picked up by charging machines, as needed, and fed to either one of the two Wellman tilting acid open hearth furnaces of 15 and 20 tons capacity.

The furnace fuel is oil, which, after delivery in tank cars, is stored in three 15,000-gal underground steel tanks in a concrete vault. From these tanks the oil is pumped to the furnaces and a mixture of oil and air fed in together. Four heats a day can be taken when required. Special heats of nickel and chrome steel castings, as well as those requiring very high carbon or particularly high tensile strength, are made when orders are of sufficient tonnage, as is frequently the case. From the tilting furnaces the liquid metal is taken by four 25 to 30 ton oil heated ladles, with bottom taps, two of which are used simultaneously, and is carried by traveling cranes to the various parts of the foundry, where the castings are to be poured.

Opposite the furnaces are the core ovens, coreroom and temporary sand storage bins, with charcoal storage at the right. When an order is received and the patterns are in proper condition to mold the core department receives its instructions and the necessary flasks are made ready, so that there may be no delay on the molding floor. In a custom foundry, where the work varies so much, it requires a good system to keep the flasks in order and properly mated. After coming from the ovens the cores are inspected and defects remedied. The core frames not only support the cores while they are being baked, but also form part of the trucks used to transport them. The loam and dry sand molding is done in a part of the foundry distinct from the green sand floors.

The foundry is served by eight large Pawling & Harnischfeger traveling cranes. Two have 80-ft. span, with a capacity of 50 tons each; five are 50-ft. cranes, designed to carry 30 tons each, and there is one of 25-ft. span rated at 10 tons. All the cranes have large overload capacity. Jib cranes, telephers and tracks running throughout the yard and shops complete the transportation system.

The various floors of the foundry are equipped with molding machines of the power squeezer and hinged types manufactured by the Tabor Mfg. Company, the

Horman Pneumatic Machine Company, the Rowlands Machine Company (adjustable table pattern), and the Killing Molding Machine Company (roll-over, straight drop style); pneumatic hoists built by the Curtis & Co. Mfg. Company, and Pawling & Harnischfegor; cold cut-off saws furnished by the Epsen-Lucas Machine Company and the Newton Machine Tool Works, the former of which are equipped with Disston inserted tooth blades and the latter with Taylor-Newbold blades; sand mills with self-discharging pans, built by the Thomas Carlin's Sons Company; pneumatic shaker screens and riddles of the Hanna Engineering Company's design; machines for straightening core wires or gaggers from the J. B. Smith Foundry Supply Company; hack saws and tumbling barrels of the company's own make, the latter for use in cleaning the smaller castings; crucible outfits, bench tools, &c.

After the castings have cooled they are taken by cranes, if large, or on cars, if small, directly to the cleaning department, which is an 80-ft. extension of the main foundry, 155 ft. wide, and fitted throughout with pneumatic devices, such as hoists, chipping hammers, sand blasts, surface-grinders of the swing frame type, built by the Safety Emery Wheel Company, and saws of various sizes capable of removing heads ranging from the smallest to those weighing two to three tons or more. At one end is a sandblast room with an exhaust fan in the side to draw off the flying dust. Compressed air for this and the other departments is piped from a main duct which runs to the center of the foundry directly from the power plant.

Adjacent to the foundry and served by a 20-ton crane built by the Industrial Works, Bay City, Mich., are two annealing furnaces designed and built by the Falk Company. The tops of the trucks upon which castings are run in to the furnace form the principal part of the floor.

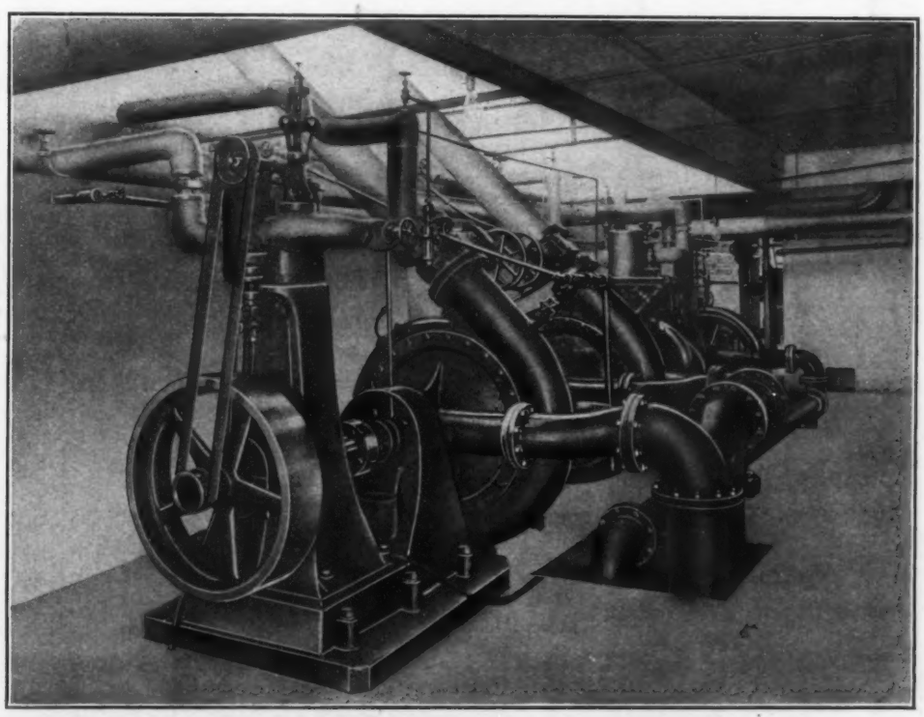
The floor of the foundry receives daylight through side windows and a monitor extending the length of the building, which has ventilator windows on each side. At night, arc lamp illumination is used. The building is nigh, giving ample space for the gas, smoke and steam to rise and pass off through the ventilators. The shops are heated in winter by a National Blower Company's system, which forces hot air through pipes running along the top of the building.

Sand is kept in sufficient supply to dry naturally before being used, and it is carefully selected and mixed, the grades adapted to each class of work being kept separate. Temporary storage bins are placed at one end of the molding room and the main supply is kept under cover in a frame structure near the railroad tracks, where brick and furnace linings are also kept.

Unusually successful results have been obtained here in electric welding. Bars welded by this process have stood tensile tests up to 58,000 lb. per sq. in.

From one to another of the various operations the work is laid out so that each man does his particular task, for example, molders do not perform such operations as pulling out castings, taking care of the bottom boards, wetting down the sand, cutting over, &c., which can be done by less skilled laborers. The molders also take no part in the pouring, for which there is a special pouring gang.

As a necessary adjunct to the foundry the company maintains its own chemical testing laboratories, which are thoroughly modern in equipment. The testing laboratory has a Riehlé testing machine of 100 tons capacity, a La Chatelier pyrometer, Siemen's water pyrometer and a full set of microscopic-photographic apparatus. This enables the Falk Company to secure a complete and minute record, physical and chemical, of all material used in the furnaces and of the resultant castings. At one side of the works is an emergency hospital, where surgical and medical aid can be rendered in case of accident.



Steam-Driven Centrifugal Pumps Supplying the Condensers.

Patterns.

Lumber for use in the pattern shop is thoroughly seasoned, and a large quantity kept constantly on hand, as it is particularly important in a steel foundry to use proper pattern material to preclude shrinkage or distortion in the castings. The Falk Company makes a specialty of turning out patterns for customers, particularly for duplicate work, or that of an intricate nature requiring special care in shrinkage measurements. All patterns made in the works or received from outside are numbered and stored in a steel frame concrete building, arranged with shelves and partitions, where a card record of them is kept. The building is fireproof with fire walls dividing it into compartments.

Orders from customers are made out at the office in quadruplicate. Two copies are sent to the shipping department, one being kept on file there and the other returned to the office when the order has been completed and shipped. One copy goes to the pattern storage and the fourth is kept on a card record at the main office. Only papers covering live orders are left in the hands of

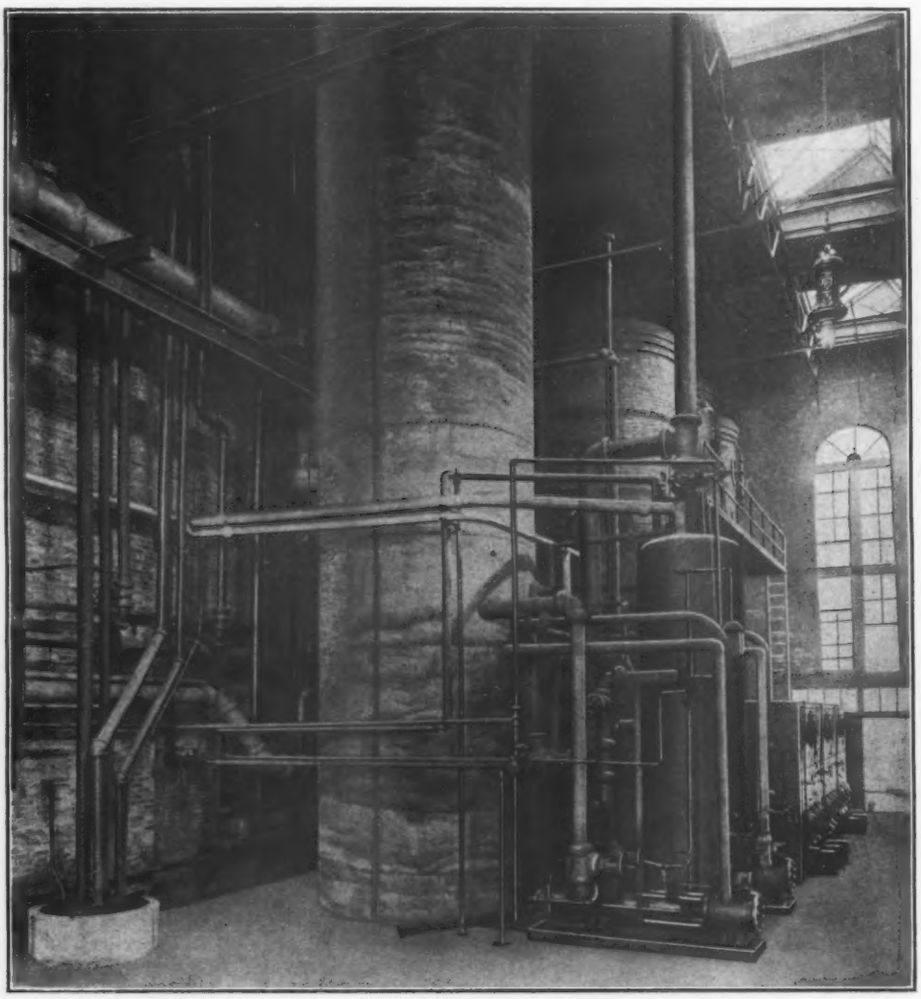
any employee, the rest being filed as soon as filled. From each of the orders received at the pattern storage building a molder's ticket is made out, and this accompanies the pattern to the foundry, rush work being noted on a slip of a special color. The exact amount of work done on a job each day is checked up at night and a record kept in the pattern storage office, which shows at any time just how far the order has progressed. All these records are kept by two men and a boy. Between the core department of the foundry and the pattern shop is a building in which patterns for immediate use are stored temporarily, awaiting disposition in the foundry. As soon as a man or gang of men has completed one operation, the foreman of the department goes to this building and selects the next pattern to be used.

The pattern shop is equipped with woodworking machinery, most of which was furnished by the Oliver Machinery Company, the Fox Machine Company, Baldwin, Tuthill & Bolton, the Security Machine Company and the Rowley-Hermance Company. An interesting tool in this department is one for cutting gear pattern teeth, built by the company itself.

When work on an order has been finished, the pattern is either returned to the main pattern storage building or else sent back to the customer. At this time a simple card record has been completed, which shows when the pattern was received, in what condition, gives a brief description of it, including the core boxes and number of pieces in the pattern, states its exact or approximate valuation, when and how it was returned to storage or to the customer, and also shows the pattern number given it at the works, with section and shelf in which it was kept while there. A paper duplicate of this card is pasted in a book under an alphabetical numerical arrangement, and for patterns returned to the customer is stamped with a large R in the corner, thereby enabling the record clerk, in going through this book, to look only at the numbers of patterns which are actually in the hands of the company.

Railroad Department.

The railroad department turns out cast steel gears and forged steel pinions, and a great variety of special work. This department has an exceedingly well equipped machine shop, including planers and lathes, furnished by the Niles-Bement-Pond Company, American Tool Works Company and the Lodge & Shipley Machine Tool Company; drilling and boring machines manufactured by Pawling & Harnischfeger; Gould & Eberhardt gear cutters; Prentice drills; Bryant milling saws of Disston manufacture; Mitts & Merrill key seaters; milling machines built by the Kempsmith Mfg. Company, and Kearney & Trecker, the former having special feed changing and tripping mechanism; Colburn boring mills: Morton draw cut shapers; Brown & Sharpe and Safety Emery Wheel Company's grinders; rail saws furnished by the Railroad Supply Company; expansible reamers of a new type, designed and built by the Falk Company; hydraulic presses, with accumulator and pump built by Logemann Bros., the latter direct driven by an Allis-Chalmers type K motor, and some very efficient and accurate pinion cutters of the company's own manufacture.



Steam Generating Plant, Showing Boilers, Feed Heater, Barometric Condensers and Feed Pumps.

In the forge shop are three steam hammers built by the Niles-Bement-Pond Company, two of 1500 lb. and one of 1000 lb. capacity, together with the Buffalo Forge Company's blowers and forges and a full complement of forging tools. The heating furnaces are of standard design. In this shop are produced monthly thousands of forged blanks for street railroad motor pinions. The frogs, switches, &c., manufactured are of the types now standard in street and interurban railroad service, with improvements made by the Falk Company, which largely strengthen their wearing qualities. Of these, the most

popular types made by the company are the hardened center manganese insert and the solid cast steel types. The special feature of the former is the binding of the separate parts together with the plates by a mass of open hearth steel, producing an integral structure. This feature is also carried out in the construction of hardened center railroad crossings. The cast steel work is made up to conform to various types and sizes of rails, designed to give the greatest strength and durability to all vulnerable parts. All wearing points and surfaces, such as frog and mate points, with running surfaces in their proximity and near the points of tongues, are hardened by a special process, and, being integral with the main casting, there are no parts to become loose.

The steel bound integral type of frogs, switches, &c., is also largely turned out by the company. This overcomes the objection to the bolted construction by eliminating all loose parts. The individual pieces are firmly bound together by a steel casting, which, in frogs, is so designed as to give protection to the frog points. The use of steel of high carbon and manganese composition insures a durability not obtainable with gray iron. Regular built up work is also produced for those requiring it. Rapid growth of interurban electric roads has created a demand for special work of the standard steam road type, and to this the company is paying particular attention.

The laying out of work is facilitated by a special revolving crane of 5 tons capacity, which makes a complete circle 150 ft. in diameter. This was built to the company's designs by the American Bridge Company. It is also a means of transferring material from one to another of the buildings immediately surrounding, each of which has tracks radiating toward the center of the circle served by the crane and projecting within this circle, so that the material can be readily loaded into cars and run to any place desired.

One feature of the railroad work is that of cast welded joints for lengthening the life of old rails. This work is done for customers either directly by the company or under lease. The apparatus required consists of an electrically operated compressor and sand blast machine, a portable cupola and motor driven blower, a flexible shaft grinding machine, clamps of various forms, molds to suit various sections of rail, wrenches, &c.

Connected with the foundry and machine shop is a toolroom, which is largely self-supporting, the company having originated here a number of salable specialties.

Power Plant.

All machinery in the works which does not take compressed air is electrically operated, principally by individual motor drive, although line shafting is used where numbers of light running machines warrant it. Electric current and compressed air are supplied from a central power station, equipped in all of its main details—engines, generator, compressors, circulating pumps, &c.—by the Allis-Chalmers Company. The machinery consists of a cross compound condensing Reynolds-Corliss engine, with cylinders 20 and 42 by 42 in. stroke, operating at 100 rev. per min., and coupled to a generator of 550-kw. capacity, delivering direct current at a terminal pressure of 250 volts; an 18 x 24 in. simple condensing Reynolds-Corliss engine of vertical pattern direct connected to a 125-kw. generator with characteristics similar to the larger machine, and two air compressors, one two-stage and one single stage (used only as an auxiliary), having capacities of 2500 and 1800 cu. ft. of air per minute. The steam end of each unit is an engine of the same type as that driving the main generator. Richardson sight feed oil pumps lubricate the cylinders of the engines and a gravity system supplies all the units; the oil flows, after use, to a filter in the basement and is pumped back to a 200-gal. tank under the ceiling of the engine room by a 4½ x 2¾ x 4 in. pump. The capacity of the system is 450 bbls. daily.

In the steam generating room are three Wickes vertical water tube boilers designed for a working pressure of 150 lb. and rated at 300 hp. each. These boilers are connected to a 12 in. header, which divides into 6 in. feeders serving the several engines. Steam is supplied at 150 lb. pressure through large separators connected with Squires traps. The piping, erected by the Pittsburgh Piping & Equipment Company, is of extra strength. Elbows were dispensed with as much as possible and long turn bends used instead, those on the steam feeds to the engine being bent to a 6-ft. radius. Crane valves, with rising stems, are employed throughout, and there is a complete system of steam, water and air control, which can be operated from either the engine or boiler room floors, insuring prompt shutoff in case of accident.

All boiler feed water is taken from the city mains and first passed through the jackets and intercoolers of the air compressors before flowing to an open Crowley heater. Thence it is lifted to the boilers by one of two Burnham outside packed plunger pumps, each 14 x 8 x 16 in., the second unit being held in reserve. There is also a 7 x 4¾ x 8 in. Prescott pump, used to work the turbine flue cleaner and for boiler washing. Only half the space in the boiler room is at present occupied, and reinforced concrete foundations have been laid for another battery. In the engine room the units can be rearranged to provide for additional capacity.

Each furnace has independent dampers between it and the breeching, which connects with a reinforced concrete stack 180 ft. high, having natural draft through an 8-ft. flue. The main damper is controlled by a Richard Thompson regulator operated from the engine room.

Each of the engines is connected to one of four Tomlinson barometric condensers. The water flows from a near-by river to a deep well, where it is elevated to the condensers by steam driven centrifugal pumps, one pump supplying two condensers. The latter are equipped with equalizer pipes to maintain a uniform vacuum on the different units. The suction pipes to the centrifugal pumps have sliding screens, which can be taken up and cleaned when necessary. A third centrifugal pump is used to remove mud accumulation in the bottom of the well; it may also be used to pump water from the deep well through the jackets and intercoolers of the air compressors and supply the heater for boiler feed in case of failure of the city mains. The exhaust of the auxiliaries goes to the Crowley heater, to which all traps also discharge.

Coal is brought in on an inclined track and dumped over inclosed bunkers having a capacity of 400 tons, the cars being pulled up by means of an electric hoist. As the bottom of each bunker is pitched toward the furnace this arrangement puts the coal from the car to the furnace door practically without shoveling.

The main generator furnishing direct current has a yoke divided horizontally, permitting easy removal if required, and the field cores are of cast steel, with laminated pole faces, so secured by countersunk screw bolts as to enable the individual poles to be separately removed and field coil changed or minor repairs made without affecting the rest of the machine. The armature is of open construction, affording a free passage for the air, which circulates through the body of the core and the radial ventilating ducts; and the coils are of the form-wound interchangeable type.

The switchboard was built by Geo. F. Rohn of Milwaukee, and is equipped with standard apparatus, including Cutler-Hammer switches. The distribution of current to the shops is through insulated underground cables, which feed a network of wires run in iron piping to the various departments where power is needed.

The Falk Company started at its present site in 1899 with a plant extending over less than a quarter of an acre, and the present works have now an area of 50 acres, including a covered floor space of nearly 10 acres. The office building is a two-story pressed brick structure fronting the works. The officers are Herman W. Falk, president; Otto H. Falk, vice-president; Charles L. Jones, second vice-president; E. A. Wurster, secretary and treasurer; Clarence R. Falk, works manager; Harold Falk, general superintendent, and W. Frank Carr, chief engineer.

The Pittsburgh, Bessemer & Lake Erie Railroad, controlled by the United States Steel Corporation, is in the market for 24 locomotives, and the Union Railroad, controlled by the Carnegie Steel Company, will buy 10 locomotives.

THE IRON AGE

Established in 1855.

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The Shop-School Combination in Apprenticeship.

No feature of the work of manufacturers' associations in the metal working trades—in particular those whose membership is largely in foundry, machine shop, boiler works and structural lines—is more important than that relating to the training up of a new generation of shop workmen. It is the perennial apprenticeship question, but under a new guise. With the occasional exception of the man who holds that the shop, and the shop only, is the place to teach a trade, manufacturers no longer have the idea that to enter upon apprenticeship means that a boy once for all cuts loose from school. It is true the various night schools, the correspondence schools and the occasional night class in drafting organized under shop auspices have long been available to the boy learning the machinist's trade, but the need of something more than these is recognized in all the more recent proposals for trade education. The average boy starting in the shop has been found so lacking in the rudimental knowledge supplied by the full common school course that employers have been for several years seeking to make up the deficiency. In one prominent machine shop in Cincinnati, as stated in the paper of Fred A. Geier before the National Metal Trades Association at its New York meeting last year, it was found that the average attendance of the 38 boys under contract to the company to learn the trade had been but seven years in the public schools. The average attendance of all boys in the schools of Cincinnati, it was also ascertained, is but five years.

Without discussing the relative value of the various plans for the training of boys directly with a view to their life work, attention is here called to the one recently adopted at Fitchburg, Mass., as described in our last issue. Contrasting favorably with the so-called manual training high schools, about the practical value of which too much is often taken for granted, the Fitchburg plan has much to commend it. In brief, it provides for a four years' high school course, the first year of which is all school work, while in the remaining three years the boy spends alternate weeks of the school term in shop and school. The team plan is adopted, the boys who select the shop-high school course being taken in pairs by the local shops, and thus two boys working in the shop in alternation, week after week, carry on the shop work that would ordinarily be done by one boy in continuous apprenticeship. There may be disadvantages of this plan, which will become plain only as it is worked. There might be a question, in the average shop town, on the score of expense, of providing extra teachers, for the shop course boys, being in school only half the time and taking different work from that of the literary courses, would need to be in classes by themselves, and such classes would doubtless be smaller than those ordinarily maintained. There must also be manufacturers willing to take the number of boys desiring each year to enter upon the combination course. Then, too, the plan contemplates that all who select this course shall have spent nine years in school before entering the shop. The statistics for Cincinnati indicate that this is considerably longer than the average school period of boys who enter shops. Many must become breadwinners earlier.

Apparently there would be an advantage in the Fitchburg plan over that provided at Cincinnati through the co-operation of manufacturers with the University of Cincinnati. The latter applies to graduates from the high school and therefore deals with boys who reach the shop three or four years later than would be the case at Fitchburg. At the beginning of the second year in the high school pupils are 15 to 17 years of age, which is presumably a better time for the influence of the shop régime to impress itself upon the boy than three years later. Further, it may well be questioned if the ordinary high school course, with so much of the time given to purely cultural studies, can profitably be taken by the boy who looks toward a shop career. In the Fitchburg combination course the high school studies pursued in the second, third and fourth years are intended as a preparation for the chosen life work. On its face the plan has much to recommend it. What remains is to know what are its drawbacks in practice.

Increase in Ore, Fuel and Flux Per Ton of Pig Iron.

Roundly it has been customary to estimate the consumption of iron ore in the United States at twice the tonnage of pig iron produced in a given year. While of all the leaner ores of the South and some other districts considerably more than 2 tons is required for a ton of pig iron, the great preponderance of Lake Superior ores in blast furnace mixtures in the North is an offset. The annual statistical report of the American Iron and Steel Association for 1907 estimates the total consumption of domestic and foreign iron ore in the manufacture of pig iron in that year at 50,100,000 gross tons, against 49,375,000 gross tons in 1906. The amount of mill cinder, scale, scrap, &c., consumed in the manufacture of pig iron is not ascertained by the association, but the Census statistics for 1904 made the total of such materials used in that year 1,865,385 tons. If a proportionate amount is figured in 1907 the total would be 2,891,346 tons, which added to the estimated consumption of iron ore gives a total of 52,991,346 gross tons of iron bearing material charged into the blast furnace last year. This represents 2.06 tons for each of the 25,781,361 tons of pig iron produced. The quotients for other years are not available, but they would doubtless show a gradual increase from a point fractionally below 2 tons, in view of the well-known fact of the decreasing iron content of the Lake ores charged into the blast furnaces of the United States.

Not only is more ore charged per ton of pig iron, but necessarily more coke and more limestone. The coke increment has been quite constant in recent years, but has not been statistically measured. The increased use of flux last year, as compared with 1906, appears in the official statistics, showing that the limestone consumed by the blast furnaces in the production of 25,781,361 tons of pig iron amounted to 14,194,584 tons. The average consumption of limestone per ton of pig iron produced

was 1233.2 lb., against 1178.8 lb. in 1906. For anthracite and bituminous furnaces the consumption in 1907 was 1247.8 lb., against 1192.8 lb. in 1906, and for charcoal furnaces it was 391.2 lb. and 378.6 lb., respectively.

Idle Patents Not Affected by the New British Law.

It has been brought to the attention of American attorneys while investigating the new British patent law in the interests of clients that no provision for compulsory license exists in the statute, either by clause bearing directly on the subject or by inference. Consequently there seems to be no bar under the act to the maintenance of patent rights by either home or foreign inventor where the patent is permitted to remain idle. The question has arisen in a practical way, and English patent authorities have given it as their opinion that the condition is as stated. A patent worked in another country must also be worked in Great Britain, under penalty of revocation. But if an American patentee, for instance, is satisfied to forego the practical use of his invention, it will remain protected in the United Kingdom for the 14 years of the life of the British patent, as well as during the 17-year period of its protection in the United States. This has not been formally decided by opinion of the courts, but patent experts seem to agree that it is a sound interpretation of the statute, the essential principle of which is that "at any time not less than four years after the date of a patent and not less than one year after the passing of this act any person may apply to the comptroller for the revocation of the patent on the ground that the patented article or process is manufactured or carried on exclusively or mainly outside of the United Kingdom." It is deduced that if the article or process is not "manufactured or carried on" at all the law does not apply.

The Canadian patent law provides for just this contingency by its compulsory license clause, which reads: "Any person at any time while the [unworked] patent continues to be in force may apply to the commissioner by petition for a license to make, construct, use or sell the patented invention, and the commissioner shall hear the person applying and the owner of the patent, and, if he is satisfied that the reasonable requirements of the public in reference to the invention have not been satisfied by reason of the neglect or refusal of the patentee or his legal representatives to make, construct, use or sell the invention, or to grant licenses to others on reasonable terms to make, construct, use or sell the same, may make an order requiring the owner of the patent to grant a license to the person applying therefor, in such forms and upon such terms as to the duration of the license, the amount of the royalties, security for payment, and otherwise, as the commissioner, having regard to the nature of the invention and the circumstances of the case, deems best. . . . The existence of one or more licenses shall not be a bar to an order by the commissioner for or the granting of a license on any application, under this section." The failure to grant a license within three months after the issuance of an order nullifies the patent.

The principle of the Canadian law which is lacking in the British law is more important than may be realized at first thought. Certain industries, notably electrical, textile and shoe machinery, have made it a practice to acquire patents on new inventions and permit them to remain idle indefinitely. An invention may be practical and useful, and were it to come into the possession of a competitor might work to his strong advantage in the market. If a manufacturer of textile machinery has a mechanism which accomplishes certain results, giving to him exclusive advantages in his trade, and an inventor evolves another mechanism to accomplish the same work in a manner patentably different, there would be an obvious benefit to the manufacturer in securing control of the second invention and any other that might follow, in order that he might retain his monopoly. He could afford to pay to keep new ideas from his competitors, permitting them to lie idle even through the lifetime of his original patent. Such an invention may constitute an improvement on the fundamental idea or a development from it, and may be especially valuable in its application when the original patent is expiring, in extending the patented life of the invention. A great many patents remain unworked in this country for a much longer period than the four years given patentees under the British act in which to establish their inventions on a commercial basis in the United Kingdom. The Canadian law makes impossible the idleness of useful ideas, for under its provisions a patent may be worked there under a license even if it be permitted to remain unused in the country where it originated.

It may be possible for the British manufacturer to utilize the provisions of the Canadian law or that of some other country where the principle of compulsory license is carried out, in securing the revocation of an American patent. The invention could, perhaps, be worked under a compulsory license in Canada, bringing it within the provisions for revocation of the British act. But this would be so clumsy and probably so expensive a course that it need not be considered seriously.

When the United States comes to incorporate a compulsory working clause in its patent law, effecting legislation which is considered inevitable in the near future, it is important that the principle of compulsory license be included. It is a safeguard worth considering. While occasions of its practical usefulness may be rare, yet when one does arise it may be of vital importance to an industry.

Without referring at all to instances of improper influence of public servants by corporations, it is not amiss to note one phase of the political excitement now rising higher throughout the country. It is the disposition shown in so many cases to segregate the business interests of the United States as having some inherent taint. After a while, when the frenzy of politics has spent itself, it may be found a good thing from many standpoints to have industry and trade going forward again with some show of life, and the value of even a large operation, giving employment to many men and adding greatly to the wealth of whole communities, may then be admitted. Just at present, though, for reasons scarcely complimentary to the average of American intelligence, proprietary connection with manufacturing, especially manufacturing on a large scale, has been put under the ban. Presumably, when whatever issues there are relate largely to business and property, the so-called business interests might be considered to have some stake in the coming election. But in this contest, exceptional in many other ways, they are apparently expected to take the part of good onlookers. When questions of starting idle plants and providing payrolls at prosperity wages come up for consideration their cooperation will again be welcomed.

The Brooks plant of the American Locomotive Company at Dunkirk, N. Y., has received an order for 30 locomotives, of which delivery is to be made in November. The name of the railroad placing the order is withheld for the time being.

CORRESPONDENCE.

The Working Requirement in Patent Law.

To the Editor: In reference to the review by the London *Engineer*, in its issue of September 4, of my article on "The Working Requirement in Patent Law" in *The Iron Age* of August 20, permit me to say that I wish to reaffirm the statements made by me in that article. So far as the general argument of the *Engineer* goes, all I ask is a careful reading of both articles by any one interested enough to do so. There are two points, however, concerning which the *Engineer* imputes error on my part, and I wish to amplify my statements on these points, in order that it may be clear to all that my position is correct. The first point is included in the following paragraph of my article:

> Further, while the legal right of a nation to such a change of front in a matter of this kind may not be open to challenge, yet its moral and commercial right to do this may be questioned.

A PATENT IS A CONTRACT.

The moral issue is wrapped up in this proposition: A patent may be considered either as a contract or as of a contractual nature. On this point Lord Eldon in Cartwright *vs.* Arnott, Eastern Term, 1800, said concerning patents:

> They were to be considered as bargains between inventors and the public, to be judged on the principles of keeping good faith, by making a fair disclosure of the invention, and to be construed as other bargains.

Again, in Harmer *vs.* Playne, 14 Vesey, 130, the same great judge said:

> Where the crown, on behalf of the public, grants letters patent, the grantee entering into a contract with the crown, the benefit of which contract the public are to have . . .

This has been affirmed by a long series of English and American decisions, which need not be cited in this article.

In this contractual transaction, the Government requires the applicant for patent to make a complete and bona fide disclosure of the invention for the benefit of the public, and also requires him to pay certain fees. In return for this, and as its part of the contract, the Government guarantees to the patentee for a fixed term of years certain definite rights set forth in the statute. In the very nature of things the patentee must perform his part at once and must complete the principal part of it before the Government begins carrying out its reciprocal part. Now, patentees under the old British statute expected that for 14 years they would be accorded the privileges provided under the old British statute. It was on this assumption that they, respectively, performed and completed their part of the transaction in disclosing their inventions to the public. That prior statute permitted the importation and sale of patented articles. Should the Government under the present law by mere force of authority impose an additional, unforeseen and burdensome requirement, such as compelling foreign patentees to manufacture in England, it is in effect a withdrawal of one of the statutory privileges in being when the patent was granted. It is, therefore, a breach of contractual faith and consequently immoral.

In the sentence, "If Mr. Morgan considers our law unjust now, let us invite him to throw his thoughts forward a few years, when, by his own ingenious argument, he will find our immorality in adopting such a statute has disappeared," the *Engineer* endeavors to carry my argument to the *reductio ad absurdum*. On the contrary, this is an exceedingly clear statement of one feature of the case. I adopt that statement as my own. That future period when the immorality of the statute disappears, except historically, is when every patent affected by the law which was issued prior to the enactment of the law has expired, and there remain no patentees except those who knew of this requirement before applying for patent.

The reason I stated that there was even a question on this point of moral right was in view of the possibility that the English courts, because of the facts above stated, may yet construe section 27 of the law to apply only to patents applied for or issued since the enactment of the law and so purge it from this possible taint.

THE LAW DIRECTED AGAINST FOREIGN PATENTEES.

In connection with my statement that the law was directed against foreign patentees, the *Engineer* comments as follows:

> How a lawyer could have fallen into such an error in the reading of an act we are at a loss to understand. . . . Can Mr. Morgan show us a single word in that sentence [quoting a fragment from paragraph 2 of section 27 of the law] which indicates that the foreign inventor is attacked?

In reply I would state that I quoted section 27, which is all of the statute that applies to this subject, in full and considered it as a unity. This is the manner of construing a statute prescribed by Lord Blackburn, in River Wear Comrs. *vs.* Adamson, 2 App., Cases 764, stating "We are to take the whole statute together, and construe it all together, giving the words their ordinary signification." Paragraph 1 in this section 27 is as follows:

> At any time not less than four years after the date of a patent and not less than one year after the passing of this act, any person may apply to the comptroller for the revocation of the patent on the ground that the patented article or process is manufactured or carried on exclusively or mainly outside the United Kingdom.

The sole ground upon which application for revocation of a patent may be based is "that the patented article or process is manufactured or carried on exclusively or mainly outside the United Kingdom."

It is true that were a British subject to manufacture outside the United Kingdom, and then import his patented things, his patent would fall under this provision of the statute. How many cases of this kind will arise? Probably not one! That foreign inventors comprise almost the entire number affected by this clause is not open to serious question, and I therefore reassert that this provision is directed against foreign inventors, and that it was so intended by the framers of the law. This provision of the law is a departure from the ancient principles of the English patent law, and this departure was made not to improve the law, but to reach foreign patentee importers.

In closing permit me one word upon the following sentence in the review: "It was morally wrong, we presume, of the United States to adopt that tariff, but time has wiped away their offense." In the case of the imposition of a duty upon imports by the United States, no moral question was involved, nor does the time element become a factor. In the first place, this is so because there are no guaranteed statutory rights held out to the importer. In the next place, there is no contractual relation covering a fixed term of years, such as that which arises through the issuance of a patent; and, last, there is no prior executed consideration moving from the importer toward the Government for the benefit of the public, as is the case with the patentee.

JOHN D. MORGAN.

NEW YORK, September 28, 1908.

Symbols for Physical Quantities.

To the Editor: Now that there has been some opportunity for discussing this question, may I be permitted to summarize the arguments that have been raised for and against the creation of new symbols? The most common objection is, "They are like Chinese characters: we could never remember them." But there will be no necessity to remember them. How many of us can remember what symbol Rankine uses for kinetic energy? Is it not sufficient if we see it when we refer to his book? Every considerate writer to-day gives a list of the symbols he uses. If all writers used the same symbols, we should soon become familiar with those with which we are most concerned, and for the rest we could refer to the list just as at present.

Some objectors do not see why the letters we have at present are not sufficient. Let them try to make a list of symbols for the 200 physical quantities for which symbols are wanted. After they have made up such a list (if such a thing is possible) to satisfy themselves, let them try to convince some one else to adopt that list. There are about 20 letters, such as m for "mass," t for "time," &c., upon which there is almost universal agreement. One or two dozen more stand a fair chance of being agreed upon. Beyond these, there is hopeless confusion simply because all the good letters are exhausted.

As to the difficulty of printing new symbols, it is of interest to know that 25 of the leading technical journals of the world published an article containing five new symbols, given as examples without any difficulty. Several of them have expressed the view that there is no difficulty from the printer's point of view. The types supplied to them—which, by the way, cost 1d (2 cents) for 30—were all of one size, and yet each paper used for the text of the article its usual standard type. The publisher of the *Elektrotechnische Zeitschrift* thinks that there would be no difficulty in arranging with a type founder to make matrixes, from which all printers could be supplied with type. Each printer would keep in stock those types which commonly occurred in his paper, and could get others on short notice. About 30 new symbols would be sufficient for articles on electro technical science.

Two papers have objected that the symbols cannot be set up on a linotype machine. It is, however, usual at the present time to set up mathematical expressions by hand. Several critics have pointed out that the new symbols should be simple and bold in outline, so that they cannot be easily mistaken for one another. This, of course, is an important matter to bear in mind.

I agree with M. Galliot that the name of the symbol should be, where possible, the name of the physical unit represented. Where the name of the unit cannot be employed, a word of one syllable might be chosen, as, for instance, "stroke," for the length of a piston stroke. Some critics say that the number of symbols required would be too great. As to that, we can make just as many as convenient. The symbol ~ became universal almost as soon as it was printed. Let us have a few more as good as that one; we are badly in need of them.

MILES WALKER.

HALE, CHESHIRE, England, September 19, 1908.

Canadian Manufacturers and Protection.

TORONTO, September 26, 1908.—At the thirty-seventh annual meeting of the Canadian Manufacturers' Association, held in Montreal in the third week of September, the question of fostering home industry by tariff protection received considerable attention, though rather with particular reference to the woolen industry than in advocacy of a general raising of the duties. But though it is this industry that is specially mentioned, the association's tariff resolution is looked upon as an antipreferential trade utterance, inasmuch as it is the woolen manufacturers of Great Britain who are chiefly benefited by the preference. British manufacturers of other lines unquestionably have gained ground in Canada as a result of the tariff discrimination in their favor, but none have made such inroads upon the trade of domestic producers here as have the British makers of woolen goods. Their competition has been destructive for many Canadian mills. The resolution protects against the policy of favoring outside manufacturers as against those of Canada. At the same time, the association passed a resolution in favor of reciprocity with Australia or any other part of the empire not already in such a relation with Canada. The exportation of pulp wood to the United States was disapproved by resolution, and the prohibition of such trade was called for.

The report of the Commercial Intelligence Committee showed that for the first time in 14 years imports of merchandise have fallen off. For the twelvemonth ending with May, 1907, they amounted to $342,674,271, whereas in the twelvemonth ending with last May their value was $333,014,358. Purchases of domestic merchandise by home consumers were also reported to be materially less in the latter twelvemonth. In consequence of the retrenchment indicated by these returns, home manufacturers were obliged to give more attention to the export trade, which has consequently grown, the exports for the former of the above mentioned twelvemonth being of the value of $249,211,351, as against $260,619,002 in the latter. All departments of trade except those under the heads of forest and animal products have shared in this increase. Exports of manufactured goods alone showed an increase of $3,000,000.

The President's Address.

In his address the retiring president, J. D. Rolland, referred to the trade depression, whose effects he considered to be less severe here than they had been in some other countries, the situation in Canada being relieved by the progressive settlement of the West and by the construction of thousands of miles of railroad. In his view the indications denote that the turning point has been reached. Buyers, he said, are beginning to contract for materials 12 to 18 months in advance. Among the lessons taught to manufacturers by the reaction in trade, he mentioned these: That thorough organization of all departments of a business is necessary; that competition is a specific for certain ills that trouble trade from time to time; that a strong national tariff is desirable. On this latter point he spoke as follows:

> For years we have pointed out that the progress of Canadian manufacturing enterprises was to be attributed to the abnormal prosperity enjoyed by the world at large and the partial protection afforded by the existing tariff, to the growing excellence of "Made in Canada" goods, and especially to the comparative freedom from ruinous competition of those highly specialized and highly capitalized industries of the United States, that were too busily engaged with their home markets to pay much attention to Canada. The moment these aggregations of capital begin to suffer from a contraction of their accustomed markets they sweep over Canada. Our experience has been that during the past year the members of the association have suffered from these causes. That we have survived it as well as we have is to be attributed to the moderate measure of protection afforded us.

The railroads, he said, notwithstanding that they have received $233,000,000 in subsidies, are not working for Canada's advantage as they should. He stated his opinion on that matter thus:

> Our Northwestern provinces are rapidly being covered with railroads leading down to the border. Their idea is not to turn over such business as they are able to pick up to Canadian lines to be hauled to the markets of the world through Canadian channels. On the contrary, they see in our great Western grain fields the rich storehouse that may be tapped to supply grist to the mill of the great American railroads. And unless we bestir ourselves, we may find when it is only too late that the control of the situation has slipped from our grasp. A year ago there were 1173 miles of American-owned and American-connected railroads in Canada, and all engaged in diverting trade to the south of the line.

At the association's banquet on the evening of the 18th, Sir Wilfrid Laurier, the Prime Minister of Canada, spoke somewhat briefly, and his remarks had main reference to the tariff resolution. He thought that the tariff as a whole should be accepted as satisfactory. It was his duty to consider the interests of all classes as well as those of the manufacturers. He took note of a suggestion made by one of the delegates that a Government Commission be sent to Britain and Germany to study the woolen industry conditions and report as to the effect upon Canada. He was entirely in favor of that idea, and a commissioner is, in fact, in Europe now for that very purpose. As to a permanent Tariff Commission, which the chairman advocated, Sir Wilfrid would be willing to have one, provided that its function be the same as that proposed for the United States.

R. Hobson of Hamilton, who is the newly elected president, spoke also at the banquet, pointing out that protection has done much for the country.

The Tariff and the Elections.

To the manufacturers it is doubtless manifest that in the election campaign which terminates on polling day, October 26, the tariff is not the predominant issue. It has been pushed from its first place in the politics of the country by other questions and new conditions. For years after the general elections of 1896, when the party that upheld the national policy was defeated, the manufacturers urged that the tariff be taken out of politics. To a considerable extent it has been. Conservatives no longer give the protection plank the first place in their party platform. This is not merely for the reason that the manufacturers are nowadays too diplomatic to recognize a single party as their champion, but it is chiefly because the settlement of the West has turned the scale to the side of the agriculturists. Neither party is now desirous of emphasizing the protectionist policy on Western platforms or in Western newspapers. As the latest redistribution and the admission of Saskatchewan and Alberta as provinces increased the number of seats

belonging to the West, Western opinion is respected by the politicians. Another question that has overhauled the tariff issue in its progress in the public interest is that of transportation. The building of railroads and canals is now popular. A railroad to Hudson Bay was promised by the Government in the last session of Parliament. The construction of the Ottawa and Georgian Bay Canal is a project that the Government has looked upon with favor and for which a large part of the country is enthusiastic. As much may be said of the proposal to deepen the Welland Canal to 20 ft. The Minister of Railways has recently given assurance that the Trent Valley Canal will be pushed to completion without delay. Not to mention the appearance of new questions and new conditions to side track the tariff issue, the centering of public interest on the Government's record—especially on what is called the "graft" feature—is keeping the people's thoughts off trade policy in this campaign.

C. A. C. J.

The French Machine Tool Duty.

French Makers Urge More Protection.

Special Agent Capt. Godfrey L. Carden, in a report to the Department of Commerce and Labor, advises that the French manufacturers of machine tools are urging an increase in existing rates of duty on machine tools imported into France. From his report the following extracts are taken:

The American machine tool manufacturers need not be surprised if France places a duty on machine tools varying between 13 and 20 per cent. There has always, perhaps, been a strong national feeling in France prejudicial to foreign tools, but I doubt if this feeling is any stronger now than in the past; in fact, I am inclined to think there is less prejudice now than heretofore. However, it is understood that a number of automobile manufacturers are largely responsible for the efforts being made to foster the development of French machine tool houses. One of the leading members of this movement is the Marquis de Dion of the De Dion Automobile Works. It is realized, however, that if these new French machine tool works are to be encouraged the tariff must be increased.

A commission in the interest of French machine tool makers has been canvassing the entire subject of late, and this commission pointedly refers to the development of the machine tool industry in America as the outcome, in part, of the tariff system and the natural conditions of the country. It is pointed out that since the elaboration of the French customs duties of 1892 the manufacture of tool machines has become one of the most important mechanical industries, though, as a matter of fact, owing to the want of any customs protection, this industry in France occupies the lowest rank in customs classification.

Reasons for Increasing Duties.

The commission calls attention to the importance of the French automobile industry in the world's trade, and emphasizes the dependence of this business on machine tools. The French workman, it is declared, is not less skillful than foreign workmen, and his ability to turn out fine machines has been amply demonstrated. Such being the case, the failure to produce high grade machine tools in France in large quantities is attributed more especially to the economic conditions of the country, and it is declared axiomatic that the development of any industry pends almost exclusively on the conditions of its environment. The French investigators declare that the American and German machine tool builders have demonstrated the truth of this axiom, that they have found in their respective countries the economical conditions which make profitable the development of tool machines, and that the Americans and Germans have been enabled to overwhelm the French builders to such an extent that the latter are practically dependent on those two countries for the bulk of machine tools.

The economic conditions referred to as existing in America apply to the general demand for machine work over hand work, and to the enormous demand for tools necessary to the construction and exploitation of our enormous railroad, iron and steel, and other manufacturing interests. In Germany the progress of the machine tool industry has been favored by the development of the metallurgic industry of the interior. In France and in England the machine tool development has kept pace with the development of the needs of the country. Germany has developed her machine tool industry without much customs protection, but it would seem as if there will be some modification in this respect before long. The new German duties have quadrupled the customs tax on machines weighing less than 250 kilos. On such machines the duties have been raised from 3 to 12 marks.

Present Rates Claimed to Be Insufficient.

It is estimated that during the past year nearly 50,000,000 francs ($9,650,000) worth of foreign made machine tools entered France. The tariff schedule of 1902 divides tool machines into three categories—namely, small and precise, medium and large. The idea seems to have prevailed that the tariff framers think only the small machine tools can be classed as precise. This the French machine tool constructors declare is entirely wrong, inasmuch as all machine tools, regardless of size, must be precise. The commission desires to see a tariff classifying machine tools into two great classes: One to embrace machine tools for general use, capable of performing varied work; the other, machine tools designed for working in series on clearly defined work. It is claimed that the first class is now manufactured in France, and that for the second class French manufacturers are dependent on foreign countries. It is further claimed that, unless the French tool manufacturers are given adequate customs protection, it is impossible to assure success for French firms which may undertake the building of machine tools of the second class. The various laws in France governing shop practice make hand work, it is asserted, dearer by 4 per cent. This refers to the laws which provide better protection to workmen against accident. Then there is the law with relation to apprentices. The eight-hour law will, if put in effect, make production still more costly.

Comparison of Rates.

Taking, as an example, a table of specific values of the three categories of foreign machines recently imported by a French builder of tool machines for his own use, it has been found that the average specific value of these machines, comprising turret lathes, &c., when weighing more than 1000 kilos, is over 3 francs (57.9 cents) the kilo. The French makers of tool machines insist on a minimum and a general tariff as follows:

For machines of more than 5000 kilos, a minimum of 30 francs ($5.79) per 100 kilos, and a general tariff of 40 francs ($7.72) per 100 kilos; for machines between 1000 and 5000 kilos, a tariff of 40 francs and 50 francs, respectively; for machines between 250 and 1000 kilos, a tariff of 50 francs ($9.65) and 60 francs ($11.58), respectively; for machines between 100 and 250 kilos, a tariff of 60 francs and 80 francs ($15.44), respectively; and for machines of less than 100 kilos, tariff of 80 and 100 francs ($19.30), respectively, or an equivalent protection of 20 per cent. ad valorem. According to the present tariff, a machine weighing more than 1000 kilos, worth 2000 francs ($386), pays 100 francs duty. This, it is claimed, is a protection of 5 per cent., which is regarded as insufficient. The rate of protection demanded is an average one, and it is pointed out that the specific values of the machines weighing more than 1000 kilos, as actually imported, are in most cases more than 3 francs (57.9 cents). It is contended that these machines should now pay a duty of 13 per cent.

The machine tool makers have drawn up a very elaborate scheme, which they are pressing for adoption, and which aims to prevent the importation of machine tools in parts. The entire subject is gone into very exhaustively, and there is no doubt that if the schedule as asked for is put in force a readjustment will be necessary on the part of foreign manufacturers. The subject is one which is concerning all agencies now in France. French machine tool makers are complaining against what they consider is the avoidance of the present customs laws,

owing to the practice on the part of some importers of taking their machines apart and introducing them in detached pieces.

It is well known that some French manufacturers of small tools, such as milling cutters, twist drills and taps, have been complaining about the introduction of foreign made tools, and I understand that the manufacturers of such tools have been advocating the raising of the duty for that class of articles.

Doubt Regarding a New Tariff.

The opinion expressed to the writer by well informed men actively engaged in the machine tool industry here is to the effect that they doubt very much if the French Cabinet will agree, on discussion before the chambers, to a new tariff law, but if this is done it is believed the change, if made, will not be as radical as requested by the commission of experts of French tool manufacturers.

Judge Gary on Co-operation.

At the dinner given in London by the Iron and Steel Institute on September 11, to Elbert H. Gary, chairman of the United States Steel Corporation, the principal topic of discussion was the maintaining of prices at a remunerative level by international co-operation. Judge Gary's remarks were in part as follows:

"The nations of the earth are being brought nearer together. Steam, electricity and other forces are enabling us to travel and to communicate with each other more speedily and with less difficulty, by land and sea and sky. And soon, it is to be hoped, we shall have a common language. The day is approaching when among the nations there will be less diplomacy and more fraternity. God speed the day! We should be striving with, and for, one another, each nation endeavoring to help itself by helping all others. Weapons of war should be converted into implements of agriculture, and every question of difference determined by intelligent and honest discussion and equitable conclusion. As applied to the present, these ideas may not be wholly practicable. The people are not ready to avail themselves of their opportunities. Feelings of distrust and doubt and envy more or less predominate. In the future, however distant, there is hope and confidence. But, as applied to some of the prominent lines of business, including iron and steel, the doctrine of conciliation and co-operation are practicable, even now. If so, and we are ready to take advantage of the fact, who can estimate the benefit to be derived?

An American Demonstration of Co-operation.

"It has been demonstrated in America during the last year that the idea is practicable. In the month of October of 1907 we were visited by a financial cyclone. It was the culmination of many unfavorable and uncontrollable currents, not necessary to detail at present. At the beginning no one could accurately forecast the future. The possibilities of a prolonged and disastrous business depression were in the minds of all. The danger related to the iron and steel trade, perhaps, more than to any other; and that has been considered the barometer of trade conditions. Most of the jobbers throughout the country had purchased large stocks at the prices prevailing when conditions were favorable, which were undisposed of. Pending contracts for construction, which involved large purchases of iron and steel, extended to every locality. Contracts for new furnaces, mills, and equipment, and for raw and semi-finished material, had been made by large numbers of manufacturers. An immediate and radical reduction in prices would have meant bankruptcy to multitudes of concerns that had been successful and were considered substantial. And this would, perhaps, have precipitated trouble in many, if not all, other lines. These conditions were realized by bankers and financiers generally, and certainly by the manufacturers of iron and steel. They recognized their responsibility and rose to the occasion.

"Early in November an invitation was extended to the leading men connected with this industry, including about 60 in number, to meet in conference, and without exception the invitation met with an affirmative and cordial response. Conditions were favorable to the cause. The United States Steel Corporation, one of the largest concerns, has a Finance Committee composed of nine gentlemen, of great experience and intelligence, and connected in various ways with nearly all other prominent lines of industry, who determine the policy of the corporation. Then, the officers of the corporation and all its subsidiary companies are efficient and energetic, and always loyal to the policies determined by the committee. They can be relied upon to promptly carry to a successful conclusion any campaign determined upon. Besides, and better still, the manufacture of iron and steel in the United States as a whole is in the hands of men who cannot be surpassed in excellency. They are intelligent, honest, broadminded and sincere.

"At the first meeting, after each one present expressed his opinion that the conditions and dangers were as I have previously stated, the doctrine of conciliation and co-operation was suggested. In some respects, at least, it was novel. In times gone by, when business prosperity was interrupted by a financial depression, or by doubt and distrust, however provoked, it had been customary for each one to consider and to endeavor to protect his own interests, regardless of all others. Each sold his own products wherever he could and at whatever prices he could obtain. Demoralization, panic and prolonged failure followed. It was customary to urge that the action was inevitable; that the law of supply and demand must control; that natural conditions cannot be changed. Parenthetically, I may say, I have my own definitions of these well worn expressions, but will not stop to name them. And so, last November, at first there were some who were more or less skeptical. They had doubts as to the success of the movement. But a large majority had confidence, and all were willing to make a trial.

How a Plan Was Worked Out.

"The suggestions which were made and finally adopted were simple. It was proposed to appoint a General Committee of Seven, with power to appoint subcommittees, connected with special lines. To the subcommittees any one interested in a particular line might apply for information and advice. And to the General Committee the respective chairmen of subcommittees or any individual might apply for information and advice. Without going into detail, it suffices to say these committees kept fully informed in regard to the affairs of all, and freely advised individuals with respect to conditions, generally or in detail. While they were given no power, their advice was usually followed. No agreement to maintain prices, restrict output, or divide territory, or any other agreement was made. It seemed clear, however, that the result would be the same if the movement was to be successful; for how otherwise could any benefit be derived? Why meet together and keep one another fully informed unless each could recognize the rights and interests of all others? Each one was acquainted with the producing capacity of the others, of the territory naturally tributary to their furnaces and mills, of the customers of the others and of the prices charged. If any one proposed to change his prices or increase his output, or sell in a new territory, he would, as a matter of honesty and fairness, inform the committee. Without going further into detail, it is important to say the effort has been successful. It was to be expected there would be some mistakes by subordinates, and that, to some extent, there would be transactions beyond the bounds of propriety and fairness; but the total result has been a great benefit. Of course, from time to time manufacturers were imposed upon by proposed purchasers, who made the usual misrepresentation that other manufacturers were selling at a reduced price. This caused more or less anxiety, and the services of the committees were required to straighten out the trouble. The tricks of the trade are too well known to make it necessary to discuss them at the present time.

"It was not long before the movement secured the approval and hearty co-operation of all concerned. Prices have generally been maintained, demoralization and insolvency prevented, and greater profits realized. The benefit to general business conditions and the influence in aiding restoration of business prosperity are testified to by financiers and by the press generally.

Perhaps the most prominent good which has resulted is found in the feeling of friendship which exists among the members of the industry. This will be of great pleasure and profit to all in the long future. Frequent meetings are held at which each one present expresses with great freedom and frankness his views concerning all questions that are involved, and all have confidence in one another. The business is well in hand. The manufacturers are running their own business for their own gain, and yet at the same time they have injured no others. On the contrary, they have advanced the interests of their customers, their employees and the public generally.

Manufacturers in All Countries Should Work Together.

"I wish to emphasize the idea this evening that practical co-operation should be extended in our line of business particularly. The manufacturers of iron and steel in all countries should be working together with and for one another. If we have the intelligence and disposition to take advantage of our opportunities, we can be of great benefit to ourselves and to all others. While success cannot be reached without effort, perseverance and patience, and, above all, confidence in one another, it may be reached if we are determined.

"Human nature is about the same the world over. We are selfish, conceited and suspicious. We are inclined to look through a glass that magnifies our own importance and rights and minimizes those of all others. We wrap around ourselves the coat of self-righteousness; but the good Lord looks down upon us and sees very little difference. When removed from temptation we are saints; but when it comes to business transactions with one another we are apt to be common sinners. We need to occupy a high plane where our vision is clear and unobstructed; where we can see the rights and interests of all others. We need to recognize the fact that by helping others we help ourselves, and that by injuring others we injure ourselves.

"I do not advocate anything that is antagonistic to the laws or to the public welfare. What I propose is the utilization of all our opportunities for the advancement of all our interests. A closer connection, a better understanding, a complete confidence, a full and free interchange of ideas, information conveyed by one to another concerning all the business in question, and an organized committee composed of men whose advice should always be followed; these thoughts amplified and formulated should bring to all of us the largest measure of success."

The West Virginia Mining Association.

The West Virginia Mining Association will hold a general meeting in the city of Charleston, W. Va., October 7. The association expects to have as its guests at that time George Otis Smith, director of the United States Geological Survey; Edward W. Parker, chief of the Bureau of Mines and Minerals; Dr. J. A. Holmes, chief of the Bureau of Technology; Captain Desborough, Inspector of Explosives for Great Britain; Victor Watteyne, engineer-in-chief for the Administration of Mines, Belgium, and a number of representatives from the mining departments and universities of West Virginia and other States. Following the introductions, the afternoon and evening will be given to the discussion of matters relating to the advancement of the mining industry in West Virginia and special papers will be presented, among which are the following:

"Recent Mine Disasters—Causes and Remedies as far as Ascertained."

"Is Dust, as Such, Explosive, and if so, What Are the Chemical Reactions and the Most Efficient Preventives?"

"The Standardization of Powders and Explosives for Underground Workings."

"The Advisability of Standardizing Electrical Appliances in Mines."

"The Education of Mine Managers in Rescue Work and the Danger Involved by Untrained Men Attempting Such Work."

Through the courtesy of President Wm. N. Page of the Virginia Railroad, and President G. W. Stevens of the Chesapeake & Ohio Railroad, a special train has been placed at the disposal of the association, and will leave Charleston at 8.45 a.m., October 8, for a trip to Princeton, Mercer County, and return. This will prove interesting to every one connected with mining by reason of the opportunity that will be given to study all of the formations belonging to southern West Virginia. Starting from Charleston, which is within 2 miles of mines in the Pittsburgh seam, the excursion will cross in succession the coals belonging to the Kanawha-Allegheny, the New River and the Pocahontas measures. Short stops will be made at the mines of the Loup Creek Collieries Company, at Page; the shaft of the New River Collieries Company, at Eccles; the mines of the Slab Fork Coal Company and possibly one or two additional points.

Wm. N. Page, Washington, D. C., is president of the association, and Neil Robinson, Charleston, W. Va., is secretary.

Wages of Steel Corporation Employees.

The *Wall Street Journal* calls attention to the fact that the United States Steel Corporation, throughout the depression which has extended over a period of nearly 12 months, has made no general reduction in the wages of its employees. While reduced production has not enabled the corporation to give steady employment to its men, they have received the same wages as in 1907, the most prosperous year in the history of the steel industry. This is the first time in history that a depression in steel has not been accompanied by a wholesale reduction in wages. Some steel prices were reduced several months ago, but there was no corresponding change in the wage schedule.

The following table shows the wages paid, number of employees, and average annual wage per man of the United States Steel Corporation from 1902 to 1907, inclusive:

Year.	Wages paid.	No. employees.	Wages per man.
1907	$160,825,822	210,180	$765
1906	147,765,540	202,457	725
1905	128,052,955	180,158	711
1904	99,778,276	147,343	677
1903	120,763,896	167,709	720
1902	120,528,343	168,127	716

It is impossible, says the journal quoted, to estimate the extent the increase in the wages of the steel workers has benefited the corporation in the way of higher operating efficiency. However, the tons of steel produced per man in 1907 were 49.4, as compared with 52.2 tons in 1906. Comparisons with 1902, 1903 and 1904 indicate a gain, as the following table giving the number of tons produced by the United States Steel Corporation, number of employees and tons of steel produced per man from 1902 to 1907, inclusive, will show:

Year.	Tons produced.	No. employees.	Tons steel per man.
1907	10,376,742	210,180	49.4
1906	10,578,433	202,457	52.2
1905	9,226,386	180,158	51.2
1904	6,792,780	147,343	46.1
1903	7,458,878	167,709	44.5
1902	8,197,232	168,127	48.9

When the Gary mills are in full operation the United States Steel Corporation will employ close to 240,000 men in normal periods.

The Sharon Steel Hoop Company, Sharon, Pa., has opened an office in Chicago, from which it will market light-formed shapes for fireproofing and concrete purposes. This is a new line for the company, and H. T. Gilbert, who has been manager of sales and not general manager, as recently incorrectly stated, will have charge of its introduction throughout the United States. He will likewise look after the sales of the company's regular products from the Western office.

A new high power milling machine is being placed on the market by the Hendey Machine Company of Torrington, Conn. The machine is of the Lincoln type, which style of miller has been brought to a high state of development by the Hendey Company. The new machine will, however, be much heavier and of much greater capacity than any previous machine of this type. In capacity it will compare with the No. 5 universal milling machine.

NEWS OF THE WORKS.

Iron and Steel.

It is understood that considerable stock has already been subscribed for by the citizens of Tarentum, Pa., for the steel plant proposed for that place. The promoters of the project are John McGinley, 544 Second avenue, and C. K. Nichols, 628 Second avenue, Tarentum.

Announcement is made that the Williamson Iron Company's furnace at Birmingham, Ala., will be put in blast within 30 days.

General Machinery.

The machine shop firm of Lemley & Schultz, 570 Elston avenue, Chicago, composed of Frederick J. Lemley and Albert L. Schultz, has by mutual consent been dissolved. The business will be continued under the firm name of Schultz & Son.

E. D. & A. F. Cronk, machinists, 9 Liberty street, Utica, N. Y., are having plans prepared for a machine shop building, to be erected at 68 Hotel street. The building will be two stories, 40 x 80 ft., brick and mill construction. The first floor will be used for the heavy machinery and the second floor for the lighter tools and storage.

The Collins Machine Shop, Collins, Miss., is arranging to move its business nearer the railroad, and intends to install more and heavier machinery in the new location.

The Savannah Locomotive Works & Supply Company, Savannah, Ga., contemplates the establishment of a branch plant at Jacksonville, Fla. It is understood that the company's business in Florida is growing rapidly and that it would be of considerable advantage to have a plant located where it could conveniently supply that territory.

Gallagher & Greene, proprietors of the Wilna Machine Company, Carthage, N. Y., have purchased property adjoining the Kesler Block, and will erect a large one-story foundry and machine shop. The firm is engaged principally in the manufacture of gas engines, but also does a general machine shop business.

The San Antonio Machine & Supply Company, San Antonio, Texas, has acquired the plant and stock of the Collins-Gunther Company for $25,000. The plant, which employs about 60 men, will be continued in operation at the present location. The company intends to go into the manufacturing business on a more extensive scale.

The Stuart & Peterson Company, Burlington, N. J., has completed the construction of its new machine shop, 30 x 100 ft., two stories, and is now installing the equipment. The building, which was formerly used as a machine shop and from which the machinery has been removed, will be made a part of the foundry.

A new flying shear for cutting tin bars has been installed in the Bessemer plant of the Republic Iron & Steel Company at Youngstown, Ohio.

The George A. Hogg Iron & Steel Foundry Company, Pittsburgh, has sold a No. 2½ belted shear, weighing 5000 lb., to the Gordon Iron Company, Chicago Heights, Ill., to cut 1¾-in. material, and a No. 2 belted shear, weighing 6000 lb., to the Clark Steel Hoop Company, Punxsutawney, Pa., to cut 1½ in. square.

Spang, Chalfant & Co., Inc., Pittsburgh, have ordered two 10-ton electric traveling cranes, with 85 ft. span, to be installed in their new mill being built at Etna, Pa. One crane will serve the puddling mill and the other the 16-in. mill.

Power Plant Equipment.

The Turbine Equipment Company, 30 Church street, New York, selling agent for the De Laval Steam Turbine Company's products in New York State, northern New Jersey and Connecticut west of the Connecticut River, has incorporated its business. The company also builds power plants and power plant machinery of all kinds. Harry Y. Haden is president and Russell Klemm secretary and treasurer.

The Bruce-Merriam-Abbott Company, Cleveland, Ohio, has recently been awarded contract from the State of Pennsylvania for two 125-hp. vertical four-cylinder natural gas engines, direct connected by means of the company's flexible coupling to two 75-kw. direct current generators, switchboard, &c., for the Pennsylvania Reform School at Morganza, Pa.; R. J. Christy Company, Fremont, Ohio, 55-hp. vertical two-cylinder gas engine, and St. Ann's Church, Buffalo, N. Y., 35-hp. two-cylinder gas engine to replace a 55-hp. four-cylinder gas engine. The company states that its business is increasing.

The city of Buffalo, through the City Council, has instructed the City Commissioner of Public Works, Francis G. Ward, City and County Building, to have specifications prepared for furnishing and installing an engine and generator at the Hamburg Canal pumping station for the purpose of furnishing light and power.

The Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y., will erect two power substations, one near Phœnix, N. Y., and one near Fulton, N. Y. Each building will be one story, 60 x 80 ft., of brick and steel construction.

The Lake Erie Boiler Works, Buffalo, N. Y., has lately closed a number of orders, among which were the following: United States Government, 12 35-ton Scotch marine boilers, 11½ x 12 ft., working pressure 180 lb.; New York, New Haven & Hartford Railroad, 15-ft. 6½ in. by 11 ft. 6 in. boiler, and for a San Francisco mining firm, 9 x 18 ft. boiler, working pressure 180 lb.

The installation of a 150-hp. vertical gas engine is contemplated by the Weatherford Water, Light & Ice Company, Weatherford, Texas, but no definite date has been reached for making this improvement.

E. W. Bentley, Pittsburgh representative of the Skinner Engine Company, Erie, Pa., has sold two 22 x 22 in. engines, which are being installed in the William F. Mosser Company's tannery, Richwood, W. Va.; also six 72 in. by 18 ft. boilers, made by the Union Iron Works. He also sold two 17 x 32 x 24 in. compound engines to the Standard Sanitary Mfg. Company, to be installed in the New Brighton plant.

The Joseph Horne Company, Pittsburgh, is taking bids for a new power plant in connection with a large addition which is to be erected to its store. Among other equipment a 600-hp. Corliss steam engine is included.

Boyts, Porter & Co., pump manufacturers, Connellsville, Pa., shipped last week to the Merchants Coal Company at Boswell, Somerset County, Pa., a duplex-acting plunger mine pump with a cement lining. It has a 13-in. water cylinder and 18-in. stroke. The pump was especially built for a 6500-ft. perpendicular elevation, and will be driven by a 250-hp. direct current Westinghouse motor. The daily capacity is rated at 1,750,000 gal. It weighs 45 tons. There was also shipped to the Star Junction, Pa., plant of the Washington Coal & Coke Company a 30 x 15-in. double plunger pump, weighing about 20 tons, having a daily capacity of 1,500,000 gal., and to be driven by a 200-hp. Westinghouse motor. The same firm is building a large electrical mine pump for the Henrietta Coal Company, for use in its mine at Dunlo, Pa. This pump is of the wood-lined type, with a 10-in. water cylinder and 12-in. stroke, to be driven by a 100-hp. Westinghouse direct current motor. A vertical deep-well pump is being built for the Orr Coal & Coke Company for its mine at Newburg, W. Va., and one of similar design will shortly be started for the Preston County Coal & Coke Company, also a West Virginia concern. A new line of standard mine and boiler pumps is to be put on the market this fall.

Foundries.

The E. T. Fraim Lock Company, Lancaster, Pa., operating the Keystone Lock Works, has lately completed additions and improvements to its brass foundry and is now in a position to make brass, bronze and aluminum castings from special patterns.

The Acme Engineering & Contracting Company, Schenectady, N. Y., is receiving bids on about 1500 tons of iron and steel castings and structural steel, to be used in the lock and dam work, sections 1, 2 and 3, contract No. 14, Erie Barge Canal.

The Hewitt Mfg. Company, St. Louis, Mo., manufacturer of brass fixtures, is building an addition to its foundry and making other improvements to cost about $100,000. The company expects to occupy its new building about the middle of December. The machinery, which will be electrically operated, has been purchased.

Fires.

The plant of the Belleville Iron & Horse Shoe Company, Belleville, Ont., was damaged $15,000 by fire September 22.

The plant of the Virginia-Carolina Chemical Company at Pinners Point, Va., was burned September 27, the loss being about $100,000.

Hardware.

The Boone Investment Company, Boone, Iowa, has concluded negotiations with the Quinn Wire & Iron Works, Scranton, Iowa, whereby the plant and business of this concern will be removed from its present location to Boone. A new plant will be built at once, which will include a well equipped foundry and machine shop of brick and concrete, one story in hight, 132 x 144 ft. Besides the production of gray iron castings the company manufactures an extended line of hardware specialties.

The Sidway Mercantile Company, which has a plant at Elkhart, Ind., for the manufacture of go-carts, and which has secured large contracts in England, is equipping a plant at Birmingham, England, to meet the provisions of the patent law in that country. It has leased quarters in a large plant that supplies light, heat and power for manufacturing.

The Blairsville Enameled Ware Company, Blairsville, Pa., has increased its capital stock from $5000 to $75,000.

The Victor Mfg. Company, Leavenworth, Kan., manufacturer of washing machines, is preparing plans for rebuilding its plant, which was recently destroyed by fire. The new plant will be larger and more modern than the old.

Miscellaneous.

The automobile factory which is being built at Muncie, Ind., by T. F. Hart, M. Maring and others, is to be financed by those interested in the project and is entirely independent of the factory fund of $125,000 which was raised by Mr. Hart. This fund is still available for the purpose of locating factories in Muncie. The building of the automobile plant has been under consideration for more than a year.

The Buffalo Smelting Works, located on the Niagara River, the Erie Canal and the Erie Railroad, between Austin and Ham-

ilton streets, Buffalo, N. Y., has completed arrangements for the electrolytic refining of copper with Niagara Falls power and has closed contract with the Crocker-Wheeler Company, Ampere, N. J., for a 500-hp. motor generator set for 2200 volt current, which will be installed in an addition to the plant, 200 x 350 ft., of brick and steel construction, just completed. The capacity will be 20,000,000 lb. of cathodes per annum. The Cataract Power & Conduit Company, Buffalo, has the contract for furnishing the Niagara Falls power.

The Susquehanna Smelting Company, which recently located at Lockport, N. Y., in the factory buildings formerly occupied by the Holly Mfg. Company, has perfected plans for a $10,000 addition to its plant.

The Locke Insulator Works, Lima, N. Y., whose plant was recently destroyed by fire, is considering a proposition to move the plant to Shortsville, N. Y., and occupying the plant recently vacated by the American Seeding Machine Company.

The Maxwell-Briscoe Company, Newcastle, Ind., manufacturer of automobiles, is equipping its plant for a capacity of 10,000 machines in 1909, a large part of which number is already contracted.

The Standard Pattern & Mfg. Company, Richmond, Ind., has increased its capital stock from $5000 to $10,000.

An order has been entered in the Federal Court at Indianapolis, Ind., directing the receiver of the Pope Motor Car Company, Albert L. Pope, to accept the offer made by an Indianapolis company for the Waverly plant at Indianapolis.. The offer was $200,000 for all the property, excepting cash on hand, $101,000. The purchasers are Herbert H. Rice, who has been general manager of the plant since 1904; Wilbur C. Johnson, assistant manager, and the following capitalists, all of Indianapolis: William B. Cooley, Carl von Hake, Hugh Dougherty, Wm. F. Kuhn, William Kothe, Jr., John R. Love, Hugh M. Love, Joseph C. Schaf and Burton E. Parrott. The new company has been named the Waverly Company and has been incorporated, with $225,000 capital stock. Mr. Rice and Mr. Johnson will be continued in their respective positions of general manager and assistant manager. The company will continue to manufacture the Waverly electric carriages and trucks.

PERSONAL.

G. P. Bassett, Jr., 2001-2002 Commonwealth Building, Pittsburgh, dealer in pig iron and coke, has been elected a director of the Fourth National Bank of that city.

Henry E. Pridmore, Chicago, manufacturer of molding machines, recently started on his annual vacation trip to Europe, from which he will return within five or six weeks.

Hollinshead W. Taylor of the old tin plate house of N. & G. Taylor Company, Philadelphia, has returned from a sojourn with his family at Dinard, on the coast of France.

The Sheffield Reform Club tendered to Sir Robert Hadfield a complimentary dinner September 17 in honor of the knighthood recently bestowed upon him. It was a noteworthy gathering, among the speakers being J. H. Davidson, Lieut.-Col. H. K. Stephenson, Sir William Clegg, W. T. Beardshaw, S. Meggitt Johnson and W. Nuttall.

E. McCormick, assistant treasurer of the Railway Steel Spring Company, has been elected treasurer, this office having been vacant for some time.

James V. V. Colwell, formerly secretary, treasurer and business manager of the Cassier Magazine Company, has sold his one-half interest in the publication to Mr. Supplee, president and editor. Mr. Colwell terminated business relations with the company September 21.

G. D. Conway has resigned as secretary of the Railway Club of Pittsburgh, owing to press of other business. Officers of this association will be elected at the annual meeting in October.

Thomas A. Keighley, general manager of the coal and coke department of the Shenango Furnace Company, at Wilpen, Pa., has resigned to accept a similar position with a West Virginia company.

Capt. Godfrey L. Carden of the United States revenue cutter service, who was temporarily transferred to the Department of Commerce and Labor, and for the past nine months has been acting as special agent for the purpose of investigating conditions in the machine tool trade in Europe, has completed his assignment and has returned to this country. His observations have been published in the consular reports and have attracted wide attention for the useful character and wide exteut of the information thus given. The advantage of sending abroad a man of his expert knowledge and trained observation in a special field has been thoroughly demonstrated in the work performed. Quite a number of his reports are still to be published. The machine tool builders of this country, through his industry and peculiar fitness for this task, have been put in possession of a vast fund of information which will undoubtedly prove of great value to them.

H. Gardner of Henry R. Merton & Co., London, is now in this country. He will visit the Bisbee District, Cananea, and later on the Boundary District and Butte.

Charles Veach, formerly order clerk at the Valley department of the Republic Iron & Steel Company, Youngstown, has been appointed assistant superintendent of the Brown-Bonnell department at Youngstown, to succeed Herbert Marsh, resigned.

Paul L. Wolfel, for some years associated with the Pencoyd Iron Works and later with the American Bridge Company, has recently been appointed chief engineer of the McClintic-Marshall Construction Company, with headquarters at Pittsburgh.

Louis M. Henoch, secretary of Joseph T. Ryerson & Son, Chicago, has disposed of his interests in that connection, and will probably go abroad about the first of the year. He has under consideration several propositions covering the field with which he is familiar, and will undoubtedly make some definite announcements upon his return to this country. Mr. Henoch has been with Ryerson & Son since 1888, and during recent years, first as general sales manager, and later as secretary, has had general jurisdiction of sales, purchases and operations of that house.

B. M. W. Hanson, works manager of the Pratt & Whitney Company, Hartford, Conn., sails from Bremen for home October 6. He has been in Europe for three months, traveling extensively and combining recreation with business.

J. A. Hatfield, president of the American Bridge Company, New York, returned this week from Europe.

Charles M. Schwab has been elected a director of the Greenwich Bank, New York City.

OBITUARY.

GEORGE B. LITTLE, vice-president and director of the Walworth Mfg. Company, Boston, Mass., died September 26 at his home on Cohasset, Mass.

H. J. BOLTON of Bolton Bros., 106-108 Fulton street, New York, died last week. He was at one time employed in the railroad department of Manning, Maxwell & Moore, Inc., and afterward was New York manager of W. L. Brubaker & Bros., Millersburg, Pa., manufacturers of taps and dies. His firm represented also the Parmelee Wrench Company and the Acme Truck & Tool Company.

ALBERT M. BULLARD died September 19, at a sanitarium in Liberty, N. Y. He had been connected as electrical engineer with many important innovations in telephony. He received his technical training at the Massachusetts Institute of Technology. Entering the service of the Thomson-Houston Company, at Lynn, his cleverness in invention brought him into personal relationship with Prof. Elihu Thomson, and to Mr. Bullard was assigned the task of developing the art of electric welding, which he perfected on lines laid out by Professor Thomson. At the time of his death Mr. Bullard was associated with other leading engineers in the solution of one of the most complicated problems of modern telephony. He leaves a widow.

The general offices of the Virginia Iron, Coal & Coke Company, consisting of vice-president and general manager, secretary and treasurer, auditor, general counsel, purchasing agent, general sales agent and claims attorney, which are at present at Bristol, Va.-Tenn., will be moved October 12 to Roanoke, Va., where all communications for those departments should be addressed.

The Iron and Metal Trades

The Markets Dull, Awaiting the Election.

A Large Sale of Cast Iron Pipe to Cuba.

There has been very little doing in any of the markets, since both buyers and sellers of Iron and Steel in different forms are awaiting the outcome of the election, nor is any prominent movement expected.

The most interesting transaction of the week is the sale of about 14,000 tons of Cast Iron Pipe for the Cienfuegos water works in Cuba. Later on about 5000 tons additional will be required. The work was taken against the competition of the Scotch shops.

Apparently none of the requirements of the Transcontinental Railway in Canada will be furnished by mills in this country. The announcement is made that the commission has awarded 16,000 tons to the Algoma Steel Company and 28,000 tons to the Dominion Iron & Steel Company. The latter, it is interesting to note, is credited with having sold 9000 tons to an East Indian railroad, practically its first appearance in the international markets.

Throughout the entire Central Western markets Pig Iron is easy, with occasional reports of further concessions. Alabama makers are firm, the moderate volume of orders which have been closed coming almost entirely from local consumers. New England is dull, but there has been a series of sales aggregating a considerable tonnage, by one interest, in the territory east of Harrisburg. This includes one lot of 10,000 tons of Basic Pig and one of 5500 tons of Foundry Iron. All this business is either for prompt delivery or for shipment during the balance of the year.

The volume of new business in the principal lines of finished Iron and Steel has been relatively light throughout. The underframes, bolsters and trucks for the 5000 cars for the St. Paul road, requiring about 23,000 tons of material, have been awarded to the Bettendorf Company. There has also been given out from 5000 to 6000 tons of Plates and Shapes for two Ore boats. One of these is for the Pitt Iron Mining Company, controlled by the La Belle Iron Works.

Copper is dull, and buyers and sellers are apart. Electrolytic may be bought at 13⅜c. to 13½c., and there is no European demand. While stocks in Europe may be within easily manageable proportions, and stocks in this country at the present time may be small, production in this country and, in fact, throughout the world is going on at a record pace. It looks, therefore, as though Copper must accumulate here in the near future in sellers' hands unless consumers can be induced to stock up. They are admittedly very bare of metal. If they fight shy at present prices, powerful interests may see fit to repeat the experiment of carrying the metal until a more auspicious opportunity.

Lead is off to 4.47½c. in New York. It is this metal which, more than any other, will be affected by the coming tariff agitation.

Spelter is slightly firmer at 4.80c., New York. Production is being curtailed.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Sept.30, 1908.	Sept.23, 1908.	Aug.26, 1908.	Sept.25, 1907.
PIG IRON, Per Gross Ton:				
Foundry No. 2, Standard, Philadelphia	**$16.75**	$16.75	$16.50	$20.25
Foundry No. 2, Southern, Cincinnati	**15.75**	15.75	15.50	21.75
Foundry No. 2, Local, Chicago	*16.50*	16.50	17.00	22.50
Basic, delivered Eastern Pa.	**16.00**	16.00	15.00	18.75
Basic, Valley Furnace	*14.25*	14.25	14.50	20.50
Bessemer, Pittsburgh	15.90	15.90	15.90	22.90
Gray Forge, Pittsburgh	*14.40*	14.40	14.65	20.90
Lake Superior Charcoal, Chicago	19.50	19.50	19.50	26.50
BILLETS, &c., Per Gross Ton:				
Steel Billets, Pittsburgh	25.00	25.00	25.00	29.50
Forging Billets, Pittsburgh	27.00	27.00	27.00	33.00
Open Hearth Billets, Phila.	26.20	26.20	26.20	31.00
Wire Rods, Pittsburgh	33.00	33.00	33.00	36.00
Steel Rails, Heavy, at mill	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross Ton:				
Steel Rails, Melting, Chicago	**14.75**	14.75	14.25	17.00
Steel Rails, Melting, Phila.	**15.00**	15.00	14.50	16.75
Iron Rails, Chicago	**18.00**	18.00	16.75	20.25
Iron Rails, Philadelphia	**20.50**	20.50	20.00	20.50
Car Wheels, Chicago	*15.25*	15.25	16.00	24.50
Car Wheels, Philadelphia	15.00	15.00	15.00	23.00
Heavy Steel Scrap, Pittsburgh	**15.00**	14.25	14.50	17.00
Heavy Steel Scrap, Chicago	13.00	13.00	13.00	14.75
Heavy Steel Scrap, Philadelphia	**15.00**	15.00	14.50	16.50
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia	**1.45**	1.45	1.40	1.75
Common Iron Bars, Chicago	1.50	1.50	1.50	1.78
Common Iron Bars, Pittsburgh	1.40	1.40	1.40	1.70
Steel Bars, Tidewater, New York	1.56	1.56	1.56	1.81
Steel Bars, Pittsburgh	1.40	1.40	1.40	1.60
Tank Plates, Tidewater, New York	1.76	1.76	1.76	1.86
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.70
Beams, Tidewater, New York	1.76	1.76	1.76	1.86
Beams, Pittsburgh	1.60	1.60	1.60	1.70
Angles, Tidewater, New York	1.76	1.76	1.76	1.86
Angles, Pittsburgh	1.60	1.60	1.60	1.70
Skelp, Grooved Steel, Pittsburgh	1.45	1.45	1.45	1.85
Skelp, Sheared Steel, Pittsburgh	1.50	1.50	1.50	1.95
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, Black, No. 28, Pittsburgh	2.50	2.50	2.50	2.60
Wire Nails, Pittsburgh	1.95	1.95	1.95	2.05
Cut Nails, Pittsburgh	1.80	1.80	1.80	2.10
Barb Wire, Galv., Pittsburgh	2.40	2.40	2.40	2.50
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake Copper, New York	**13.75**	13.75	13.62½	15.00
Electrolytic Copper, New York	*13.37½*	13.37½	13.50	14.75
Spelter, New York	**4.80**	4.75	4.65	5.25
Spelter, St. Louis	**4.65**	4.60	4.50	5.15
Lead, New York	*4.47½*	4.50	4.57½	4.75
Lead, St. Louis	*4.32½*	4.35	4.40	4.55
Tin, New York	**29.62½**	28.75	29.25	37.15
Antimony, Hallett, New York	7.75	7.75	8.00	11.00
Nickel, New York	45.00	45.00	45.00	45.00
Tin Plate, 100 lb., New York	$3.89	$3.89	$3.89	$4.09

Chicago.

FISHER BUILDING, September 30, 1908.—(*By Telegraph.*)

The contract for Steel underframes, bolsters and trucks for the 5000 cars to be built by the Chicago, Milwaukee & St. Paul Railroad has been secured by the Bettendorf Company, Davenport, Iowa. Approximately 23,000 tons of Steel will be required for this construction, and since the entire order is to be completed within six months, specifications for Plate and Shape requirements will soon begin to go to the mills. The same company was recently awarded a contract for 750 Steel tram cars by the Illinois Tunnel Company, and 500 tons of Plates for the car bodies are being rolled by the mills of the leading interest. The railroads generally, however, are not furnishing any new business to speak of and are, moreover, specifying very sparingly against existing contracts. Rolling schedules of the Rail mills are not filled far ahead, nor are they being materially extended by additional specifications. It is now too late to expect a marked degree of improvement in this respect during the remainder of the year. Manufacturing activities among the implement makers has not developed to the extent that was expected, and Steel Bar specifications have not shown continued increase in volume proportionate to the large amount of tonnage under contract. The backwardness of this class of consumers is due in some measure at least to a long continued and widely prevalent drought. A slight slowing up noted in the demand for Wire products is likewise attributed to this cause. Not much of the large tonnage of Structural Material being figured on by fabricators was included in the transactions closed last week.

Sheets are fairly active, but in other lines buying is closely restricted to present needs. Merchant Pipe holds about even, while Boiler Tubes are extremely quiet. Dullness in Pig Iron and Scrap is especially pronounced. New business in both lines is extremely light, but prices remain practically unchanged.

Pig Iron.—Business is practically at a standstill. What few orders have been placed in the past week—and they are very few—have been for car lots for immediate delivery. The continued absence of inquiries for first quarter tonnage emphasizes the indifference of consumers as to provision for this period, and their expectation that prices will at least not in the near future develop an upward tendency. None of the leading Southern furnaces, with possibly one or two exceptions, has definitely announced price schedules on Iron for next year's delivery, but $13, Birmingham, is generally accepted as the basis upon which those interests actively seeking business in this market are willing to negotiate. No contracts, as far as we are able to learn, have been placed at this figure, and buying of Southern Iron is almost wholly suspended in Northern territory. Northern Iron is now flatly upon a basis of $16.50 for last quarter business. There have been no recent offers of attractive tonnage that would afford a satisfactory test of the general firmness at this level. The only inquiry heard of that promises to produce immediate results is one for 1300 tons from a local consumer. This represents needs which demand delivery within four to six weeks. Aside from this, the few scattering inquiries out are regarded as having been made for the purpose of sounding the market. Except that the prevailing dullness is somewhat intensified, conditions on the whole have undergone no material change since the last report. The following quotations are for early delivery, f.o.b. Chicago:

Lake Superior Charcoal	$19.50 to $20.00
Northern Coke Foundry, No. 1	17.00 to 17.50
Northern Coke Foundry, No. 2	16.50 to 17.00
Northern Coke Foundry, No. 3	16.00 to 16.50
Northern Scotch, No. 1	17.50 to 18.00
Southern Coke, No. 1	17.35 to 17.85
Southern Coke, No. 2	16.85 to 17.35
Southern Coke, No. 3	16.35 to 16.85
Southern Coke, No. 4	15.85 to 16.35
Southern Coke, No. 1 Soft	17.35 to 17.85
Southern Coke, No. 2 Soft	16.85 to 17.35
Southern Gray Forge	15.35 to 15.85
Southern Mottled	15.10 to 15.60
Malleable Bessemer	17.00 to 17.50
Standard Bessemer	17.65 to 18.10
Jackson Co. and Kentucky Silvery, 6 %	19.40 to 19.90
Jackson Co. and Kentucky Silvery, 8 %	20.40 to 20.90
Jackson Co. and Kentucky Silvery, 10 %	22.40 to 22.90

(*By Mail.*)

Billets and Rods.—The demand for Billets continues to be of a desultory character and includes no orders of notable tonnage. A few buyers of heavy machinery are meeting their immediate requirements with more or less frequent orders for Forging Billets in small lots, but the larger users, such as the car shops, are not much in evidence in the market. On such business as is moving the regular price of $28.50, base, Chicago, for Forging Billets is, we are advised, being generally well maintained. Wire Rods are fairly active, being supported by a reasonably satisfactory demand in Wire products. Prices are reported to be firmly held at the following quotations: Bessemer, $33 Basic, $34; Chain, $33, all at Pittsburgh.

Rails and Track Supplies.—Business in Standard Rails is limited to occasional orders of unimportant size, which seem to represent strictly emergency needs. Specifications, moreover, against existing contracts are coming out slowly, and in some cases have been wholly suspended for the present. The No. 1 mill at the South Works of the Illinois Steel Company, rolling Standard Sections, is still in operation, but is gaited down to about 55 per cent. of capacity. Enough additional orders for Light Rails have been entered the past week to insure a total tonnage for September practically equal to that of August, which amounted to something over 4000 tons, taken by the leading interest. The run of orders for Track Supplies fluctuates from week to week, and the past few days have developed but little new business. We quote as follows: Angle Bars, accompanying Rail orders, 1908 delivery, 1.50c.; car lots, 1.60c.; Spikes, 1.80c. to 1.90c., according to delivery; Track Bolts, 2.10c. to 2.15c., base, Square Nuts, and 2.25c. to 2.30c., base, Hexagon Nuts. The store prices on Track Supplies range from 0.15c. to 0.20c. above mill prices. Light Rails, 25 to 45 lb., $26; 20-lb., $27; 16-lb., $28; 12-lb., $29. Standard sections, $28, f.o.b. mill, full freight to destination.

Structural Material.—Comparatively few contracts were closed last week, and among them were none of the more important projects now under consideration. The principal transactions reported include 1316 tons for the Chicago Musical College and 550 tons for the Exchange National Bank Building, Colorado Springs, Colo., both of which were taken by the Hansell-Ellcock Company, Chicago. The fabricated work on the Spaulding & Merrick Building, Chicago, which is to be partly of Steel and partly of reinforced concrete construction, has been let by the Thompson-Starrett Company, general contractor, to the Hansell-Ellcock Company and A. Bolter & Sons. The Structural work, 533 tons, for a building to be erected by the Wyeth Hardware Company, St. Joseph, Mo., will be fabricated by the Berry Foundry & Mfg. Company of that city. Specifications of about 1500 tons of railroad bridge material have been received by the American Bridge Company, which also booked a number of new orders of small tonnage. It is expected that bids will be opened this week on the Steel for the new Northwestern Depot. Plans for this building have been revised and the original estimates of Structural Material required are considerably reduced, the present design calling for about 4200 tons, as against 12,000 tons formerly reported. This, of course, does not include the umbrella sheds and approaches, for the construction of which a larger tonnage will be needed later on. Plans are being prepared for a 12-story hotel and office building to replace the Lee Hotel, Oklahoma City, Okla., recently destroyed by fire, in which the Structural requirements are estimated at 800 tons. While the volume of specifications being received by the mills is not large enough to insure uninterrupted operation, the amount of prospective tonnage now being figured on by fabricators promises a larger degree of activity as soon as the backwardness in general construction work is overcome. Prices from store are 1.95c. to 2c. Mill prices at Chicago are as follows: Beams and Channels, 3 to 15 in., inclusive, 1.78c.; Angles, 3 to 6 in., ¼-in. and heavier, 1.78c.; larger than 6 in. on one or both legs, 1.88c.; Beams, larger than 6 in. on one or both legs, 1.88c.; Beams, larger than 15 in., 1.88c.; Zees, 3 in. and over, 1.78c.; Tees, 3 in. and over, 1.83c.

Plates.—While there has been no noticeable improvement in new business, the prospect for some fair sized orders in the near future, as a result of some recently placed car orders, affords hopes of betterment. Steel under frames for the 5000 cars to be built by the Chicago, Milwaukee & St. Paul call for around 23,000 tons of material, a fair portion of which will be supplied by the Plate mills. In other directions, however, there is not much in sight that will produce tonnage of noteworthy size. Prices are reported to be somewhat firmer and more evenly held at regular quotations than has been the case for some time. We quote mill shipments as follows: Tank Plates, ¼-in. and heavier, wider than 6¼ and up to 100 in. wide, inclusive, car lots, Chicago, 1.78c.; 3-16 in., 1.88c.; Nos. 7 and 8 gauge, 1.93c.; No. 9, 2.03c.; Flange quality, in widths up to 100 in., 1.88c., base, for ¼-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.88c.; Flange, quality, 1.98c. Store prices on Plates are as follows: Tank Plates, ¼-in. and heavier, up to 72 in. wide, 2c. to 2.10c.; from 72 to 96 in. wide, 2.10c. to 2.20c.; 3-16 in. up to 60 in. wide, 2.10c. to 2.25c.; 72 in. wide, 2.30c. to 2.40c.; No. 8, up to 60 in. wide, 2.10c. to 2.15c.; Flange and Head quality, 0.25c. extra.

Sheets.—Galvanized Sheets continue to hold the lead in demand over Black Sheets. A fair amount of new business is being placed, but buyers still adhere to the practice of ordering for present needs and insist upon prompt shipments. Jobbers report a moderate demand for the light gauges of both Galvanized and Black Sheets, but the heavier gauges of the latter are moving slowly. Regular prices continue to be cut $1 to $2 a ton by some mills. We quote mill shipments as follows, Chicago: Blue Annealed, No. 10, 1.98c.; No. 12, 2.05c.; No. 14, 2.08c.; No. 16, 2.18c.; Box Annealed, Nos. 17 to 21, 2.43c.; Nos. 22 to 24, 2.48c.; Nos. 25 and 26, 2.53c.; No. 27, 2.58c.; No. 28, 2.68c.; No. 29, 2.78c.; No. 30, 2.88c.; Galvanized Sheets, Nos. 10 to 14, 2.63c.; Nos. 15 and 16, 2.83c.; Nos. 17 to 21, 2.98c.; Nos. 22 to 24, 3.13c.; Nos. 25 and 26, 3.33c.; No. 27, 3.53c.; No. 28, 3.73c.; No. 30, 4.23c.; Black Sheets from store: Blue Annealed, No. 10, 2.15c.; No. 12, 2.20c.; No. 14, 2.25c.; No. 16, 2.35c.; Box Annealed, Nos. 18 to 21, 2.60c.; Nos. 22 to 24, 2.65c.; No. 26, 2.70c.; No. 27, 2.75c.; No. 28, 2.85c.; No. 30, 3.25c.; Galvanized from store: Nos. 10 to 16, 3c.; Nos. 18 to 20, 3.15c.; Nos. 22 to 24, 3.30c.; No. 26, 3.50c.; No. 27, 3.70c.; No. 28, 3.90c.; No. 30, 4.40c. to 4.45c.

Bars.—The bulk of specifications are being furnished by the agricultural implement makers or allied interests, but the offerings from these sources have not grown perceptibly in volume in the past week or two. Users are ordering sparingly and are not going far beyond the immediate requirements with specifications. It is quite evident from the urgency of requests for prompt shipment that no stocks of considerable size are being carried by manufacturers. The attitude on all hands seems to be one of waiting for developments. Much the same conditions govern the movement of Iron Bars. Orders are scattered and comprise small lots, which makes it extremely difficult for the mills to anticipate rolling schedules. Most of the mills in this district are running off and on as the accumulation of orders permit, and it is hardly expected that the situation in this respect will be materially improved for several weeks at least. Quotations, Chicago, are as follows: Steel Bars, 1.58c., with half extras; Iron Bars, 1.50c.; Hoops, No. 13, and lighter, 1.98c., full extra Hoop card; Bands, No. 12 gauge, and heavier, 1.58c., half extra Steel Bar card; Soft Steel Angles and Shapes, 1.68c., half extras. Store prices are as follows: Bar

Iron, 2c. to 2.15c.; Steel Bars, 1.90c. to 2c.; Steel Bands, 1.90c., as per Bar card, half extras; Soft Steel Hoops, 2.25c. to 2.35c., full extras.

Merchant Pipe.—As compared with August the business for September will be about an even break in point of tonnage of new orders entered. This result is not particularly encouraging since September is usually a more active month. Under ordinary conditions stock shipments are ordered forward in September to secure the advantages of lake rates. This year, however, prospective wants are not being considered and jobbers continue to buy for actual needs. The following mill discounts are quoted: Black Pipe, ¾ to 6 in., 73.2; 7 to 12 in., 70.2; Galvanized, ¾ to 6 in., 63.2. These discounts are subject to one point on the base. From store, in small lots, Chicago jobbers quote 73 per cent. on Black Steel Pipe, ¾ to 6 in. About three points above these prices is asked for Iron Pipe.

Boiler Tubes.—A little better demand is noted for Locomotive Tubes. Most of the railroads are buying a little more freely for repair work, and it is understood that the Illinois Central is among the buyers making purchases for this purpose. The extremely quiet demand for Merchant Tubes reflects continued inactivity in the boiler shops and indicates that not much new boiler construction is under way. Mill quotations for future delivery, on the base sizes, are as follows: 2¾ to 4½ in., inclusive, Steel Tubes, 63.2; Iron, 50.2; Seamless, 50.2; 2½ in. and smaller, and lengths over 18 ft., and 2½ in. and larger, and lengths over 22 ft., 10 per cent. extra. Store prices are as follows:

	Steel.	Iron.	Seamless.
1 to 1½ in.	35	35	35
1¾ to 2¼ in.	50	35	35
2½ in.	52½	35	35
2¾ to 5 in.	60	47½	47½
6 in. and larger	50	35	..

Merchant Steel.—While not up to the mark of the two preceding weeks in volume, the specifications last week were fairly satisfactory. Besides a moderate demand from the implement makers, the orders for Tire Steel coming from the vehicle makers reflect some activity in these lines. Supplementing the tonnage from other sources, some fair sized orders from jobbers have been received for miscellaneous shapes, such as Sleigh Shoe and Toe Calk Steel. Shafting is quiet, no orders of important size being reported. We quote as follows: Planished or Smooth Finished Tire Steel, 1.78c.; Iron Finish, up to 1½ x ½ in., 1.73c., base, Steel card; Iron Finish, 1½ x ½ in. and larger, 1.58c., base, Tire card; Channels for solid Rubber Tires, ¾ to 1 in., 2.08c., and 1⅛ in. and larger, 1.98c.; Smooth Finished Machinery Steel, 2.08c.; Flat Sleigh Shoe, 1.63c.; Concave and Convex Sleigh Shoe, 1.83c.; Cutter Shoe, 2.05c.; Toe Calk Steel, 2.13c.; Railroad Spring, 1.98c.; Crucible Tool Steel, 7¼c. to 8c., and still higher prices are asked on special grades. Cold Rolled Shafting on contracts for 100 tons and over, 57 per cent. off; 56 per cent. off in car lots; 52 per cent. in less than car lots, on which carload freight is allowed within base territory.

Cast Iron Pipe.—Most of the work coming to the foundries is supplied by the demands of small municipalities. Lettings ranging from 100 to 500 tons are fairly numerous, but larger contracts are extremely scarce. Among the awards of last week were 300 tons let by Decatur, Ill., and 200 tons by Hammond, Ind., both of which were taken by the United States Cast Iron Pipe & Foundry Company. A lot of 300 tons representing the requirements of Winfield, Kan., is up for letting this week. Prices are unchanged, and we quote nominally, per net ton, Chicago, as follows: Water Pipe, 4 in., $27; 6 to 12 in., $26; 16 in. and up, $25, with $1 extra for Gas Pipe.

Metals.—Last week was one of dullness in all Metals. The aggregate volume of transactions was light, and though prices have not sagged perceptibly, the general trend has been weaker. In view of present conditions consumers are not disposed to buy any more than is actually needed to keep them going. Quotations are as follows: Casting Copper, 13½c.; Lake, 13¾c. to 14c., in car lots, for prompt shipment; small lots, ¼c. to ⅜c. higher; Pig Tin, car lots, 32½c.; small lots, 34½c.; Lead, Desilverized, 4.60c. to 4.65c., for 50-ton lots; Corroding, 4.85c. to 4.95c., for 50-ton lots; in car lots, 2¼c. per 100 lb. higher; Spelter, 4.80c.; Cookson's Antimony, 10½c., and other grades, 9¾c. to 10¼c.; Sheet Zinc is $7, f.o.b. La Salle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 13½c.; Heavy Copper, 13¼c.; Copper Bottoms, 12c.; Copper Clips, 13¼c.; Red Brass, 12c.; Yellow Brass, 9½c.; Light Brass, 7c.; Lead Pipe, 4.30c.; Zinc, 3¾c.; Pewter, No. 1, 21c.; Tin Foil, 23c.; Block Tin Pipe, 25c.

Old Material.—The buoyancy that characterized the market at the beginning of the present month has disappeared, and is succeeded by a condition of apathy that precludes activity in trading. Dealers hesitate to make large commitments at the present market, in face of the uncertain solution of problems which are believed to affect future values and demand. It is understood that $13.85 was offered for No. 1 Wrought Scrap in the Chicago, Burlington & Quincy list last week, but it went to a Western market, presumably on account of more advantageous delivery. A sale of 400 tons of No. 1 Cast, at $13.75, Chicago, is noted. The demand from consumers is not increasing fast enough to afford a substantial prop to the market, but the limited tonnage offered by the railroads in a measure counterbalances the diminished consumption. Mills and melters evidently see nothing in the situation, either present or prospective, to warrant their buying ahead of current needs, and are therefore pursuing this policy. The following prices are per gross ton, f.o.b. Chicago:

Old Iron Rails	$18.00 to $18.50
Old Steel Rails, rerolling	15.50 to 16.00
Old Steel Rails, less than 3 ft.	14.75 to 15.25
Relaying Rails, standard sections, subject to inspection	20.00 to 21.00
Old Car Wheels	15.25 to 15.75
Heavy Melting Steel Scrap	13.00 to 13.50
Frogs, Switches and Guards, cut apart	13.50 to 14.00
Mixed Steel	10.25 to 10.75

The following quotations are per net ton:

Iron Fish Plates	$16.50 to $17.00
Iron Car Axles	20.00 to 20.50
Steel Car Axles	17.50 to 18.00
No. 1 Railroad Wrought	13.50 to 14.00
No. 2 Railroad Wrought	12.50 to 13.00
Railway Springs	13.00 to 13.50
Locomotive Tires, smooth	13.25 to 13.75
No. 1 Dealers' Forge	10.25 to 10.75
Mixed Busheling	8.00 to 8.50
Iron Axle Turnings	6.75 to 7.25
Soft Steel Axle Turnings	6.75 to 7.25
Machine Shop Turnings	6.75 to 7.25
Cast Borings	5.50 to 6.00
Mixed Borings, &c.	5.50 to 6.00
No. 1 Mill	8.00 to 8.50
No. 2 Mill	7.00 to 7.50
No. 1 Boilers, cut to Sheets and Rings	8.50 to 9.00
No. 1 Cast Scrap	12.75 to 13.25
Stove Plate and Light Cast Scrap	11.50 to 12.00
Railroad Malleable	12.25 to 12.75
Agricultural Malleable	11.00 to 11.50
Pipes and Flues	9.75 to 10.25

St. Louis.

ST. LOUIS, September 28, 1908.

Nearly all the interests identified with the Iron trade report a moderate but steady improvement in both inquiry and sales. This betterment of the situation was in many lines confidently expected, since there is always with these parties a revival of activity at this season of the year. It is, however, the exception where they find the demand equal to that of 1907. Manufacturers of Metal Beds, Steam Radiators, Saws, Lead Pipe, Wrought Iron Ranges, Dies, Stoves, Wire Rope and Electrical Appliances especially note an increase in the volume of orders, and look for a satisfactory fall trade.

Coke.—With some of the local agencies a moderate quantity of Coke is being placed, while others find the market quiet, so far as actual bookings are concerned. The tone of the market is firm, and the price range is $2.15 to $2.75, at oven, the lower price for prompt shipment, and the higher for shipment from the present time and covering first half of 1909. Owing to the attitude of some of the large furnaces in the Connellsville District, in refusing to quote for first quarter 1909, the volume of business is not as large as it otherwise would be. One house reports inquiries for 1200 tons for shipment from October, 1908, to July, 1909.

Pig Iron.—Merchants report in some cases a quite satisfactory business in Pig Iron for the week, while with others there is not so much doing as of late, though they find foundrymen ordering out freely on contracts. One house states that two furnaces which it represents are sold up to January 1, and are also behind with specifications. It has inquiries covering 1000 tons, shipment balance of this year, and 2000 tons for shipment over the first quarter, 1909. Another house reports sales mostly spot, with an urgent request for immediate shipment of entire purchases. There are still a number of furnaces which decline to quote for first quarter, 1909, and as fully one half the inquiry is for that delivery, it tends to restrict the volume of business. There is some inquiry for Basic for prompt shipment. We quote for No. 2 Foundry, shipment over balance of 1908, $13, Birmingham, and for shipment first half 1909, $13.50. Reports of lower prices are believed either to cover resale Iron or inferior quality. In some cases, also, the time of delivery and freight rate might lead to the price being shaded.

Finished Iron and Steel.—In addition to the demand for Structural Steel from architectural Iron companies and building contractors, a continued demand is coming for bridge construction, principally for public highways in Missouri. The demand for Bars for agricultural implements and wagon building is steady, and there is a good call for Bolts and Spikes. A Southwestern railroad is in the market for Standard Rails, and there is still a fair inquiry for Light Rails.

Old Material.—A moderate demand is noted from consumers, mainly for Steel, Wrought and Cast Scrap. The balance of the list is practically a dealers' market. Iron Rails are neglected, and the price is nominal. There is a sufficient demand for most Material to establish quotations as given below. It is believed the railroads in this territory

have marketed their holdings so freely that offerings will rule light in the near future. We quote as follows, per gross ton, f.o.b. St. Louis:

Old Iron Rails	$16.50 to $17.00
Old Steel Rails, rerolling	15.50 to 16.00
Old Steel Rails, less than 3 ft	14.25 to 14.75
Relaying Rails, standard sections, subject to inspection	22.50 to 23.50
Old Car Wheels	15.00 to 15.50
Heavy Melting Steel Scrap	14.00 to 14.50
Frogs, Switches and Guards, cut apart	13.50 to 14.00
Mixed Steel	11.00 to 11.50

The following quotations are per net ton:

Iron Fish Plates	$15.50 to $16.00
Iron Car Axles	18.50 to 19.00
No. 1 Railroad Wrought	13.50 to 14.00
No. 2 Railroad Wrought	12.50 to 13.00
Railway Springs	13.00 to 13.50
Locomotive Tires, smooth	13.00 to 13.50
No. 1 Dealers' Forge	11.50 to 12.00
Mixed Borings, &c	5.50 to 6.00
Machine Shop Turnings	8.00 to 8.50
No. 1 Boilers, cut to Sheets and Rings	9.50 to 10.00
No. 1 Cast Scrap	12.00 to 12.50
Stove Plate and Light Cast Scrap	10.50 to 11.00
Railroad Malleable	11.00 to 11.50
Agricultural Malleable	10.00 to 10.50
Pipes and Flues	8.75 to 9.00

Lead, Spelter, &c.—Though the demand for Lead is small, the indications are favorable for improvement. The market is ruling at 4.35c. Lead Ore is quoted at $28.50, f.o.b. mine, and the production is taken up every week. Spelter is not active. We quote 4.62½c., with special brands held at 4.70c. There is likely to be some change for the better in the near future, as the demand for the finished products is gaining. Zinc Ore is steady, at $38, Joplin basis.

The Decatur Bridge Company has recently secured several further contracts for Structural Material for highway bridges, and also for Steel for building purposes. Inquiries are becoming more frequent from interior points.

San Francisco.

SAN FRANCISCO, September 23, 1908.

Activity in the Pacific Coast Iron and Steel industries has not increased perceptibly in the last two weeks, though there is a little more movement than last month. The inquiry for machinery of some descriptions is more general, and there is also a good jobbing movement of Merchant Pipe and oil well supplies. Individual sales in most lines are small, the general tendency being to limit expenditures, but the whole volume of business is by no means discouraging. There is somewhat more inquiry for mining machinery, though this line is not so active as was expected in the summer. Nothing of any importance has developed in Drill Steel, purchases being few and generally small. Light Rails and railroad supplies for the lumber and mining roads are still very quiet, as few improvements are being made, and about the only work going on is for the necessary repairs. There is practically no movement of Standard Rails in this market at present. The lumber trade is improving considerably, both here and in the North, and some business in the way of new equipment is expected during the fall, though there is little new work at present. More inquiry for pumping, dredging and irrigating machinery is reported than for some time previous, while the engineering concerns in the South find a constant demand for supplies for the oil fields, the greater part of this work going to Los Angeles. The local trade, however, is greatly encouraged over the discovery of oil at Livermore, Cal., which will tend to bring more of the supply trade in this direction. General improvements are now being made in the Kern County oil fields, and an extensive water supply system is being installed, which will enable the wells in that district to operate more constantly than they have during the past summer.

Structural Material.—Numerous plans for new buildings in San Francisco have been announced in the last week or two, and a large number of them call for Class A construction. Few structures of notable size have been started recently, however, and there is a quite distinct tendency to erect comparatively low buildings for store purposes. Work will soon begin on some expensive buildings only one to four stories in hight. Many of the structures now being started are to be made extra heavy, with the intention of adding a number of stories later on, when the demand for office space increases. Contracts for Structural Steel since last report have not been numerous, and most of the business is in a rather small way. The prospect for the remainder of the fall is for moderate activity in this line, with few large contracts, but enough small ones to make up a fair total. A contract has been let for the Steel for the Pacific Realty Building, on which work will soon begin, and the Western Iron Works has taken a contract for Steel and Cast Iron for a large building at the corner of Sutter and Kearny streets. A number of structures in prospect are the San Francisco National Bank Building, California and Liedesdorff streets, four stories; an eight-story hotel building at Van Ness and Pacific avenues; a six-story Class A building at Sacramento and Kearny streets, and a five-story building for the Lodge of Elks, to cost about $100,000. On the second set of bids, the United States Government has awarded the contract for the construction of the transport docks at Fort Mason to the San Francisco Bridge Company, for $1,286,000. Baker & Hamilton have taken a contract for Steel Wire Nails for the State Prison at San Quentin, Cal., at $2.85 a keg. The contract for 600 tons of Steel Bars for the new concrete buildings at the prison has not yet been awarded. The prison is to be entirely remodeled, and the first of the new buildings is to contain 600 cells, and will cost about $800,000. The army transport Crook sailed from San Francisco September 15, with a large quantity of Structural Iron work for Government construction at Manila.

Pig Iron.—No improvement has taken place in the San Francisco Pig Iron market, and the outlook is not encouraging. The foundries have a little more work on hand than at last report, but they are still very quiet. The slight tendency to buy for spring delivery which was noted before has almost disappeared, and stocks are difficult to move, even at liberal concessions. No notable arrivals of Chinese, English, or Scotch Pig Iron have appeared in this market since last report. Dealers in foundry supplies say that the market is in a worse condition than they have seen for years, most of the foundries still having large stocks that were taken on last fall, and there is no prospect of any extensive demand until present holdings are greatly diminished. No. 1 English, Scotch, and Chinese Pig Iron is quoted at $23 to $25 per ton, with not enough business to establish any very definite prices. Some importers are reported to be offering foreign Pig Iron for spring delivery as low as $21, with very little response. A movement is now on foot among the local dealers to secure a material reduction of freight rates on domestic Pig Iron, and there is some hope of success. There is no movement of domestic Pig Iron in this market at present.

Coke.—Coke is in about the same condition as Pig Iron, with large stocks on hand, and very little consumption. No large lots of foreign Coke are coming in, and prices remain at about $12 to $14 per ton, as last quoted.

Cast Iron Pipe.—The improvement recently noted in the market on Cast Iron Pipe has not continued, and the movement is now of rather small proportions. The outlook, however, is for a fairly good volume of business within the next few months, as improvements of water systems are being carried on all over the State. There are a few small inquiries from outside towns, but the movement is mostly in single carloads, with no tonnage to speak of. No important contracts have recently been let in the South, and while Seattle is putting in more Cast Iron Pipe all the time, the material is being secured in small allotments. Local dealers are all waiting for further developments in regard to the new salt water fire protection system, but the specifications will probably not be ready for about six months. Since the municipal bond issue of $3,514,520 has been sold to E. H. Rollins & Sons, $1,080,344 is available for the new system and the plans are rapidly being developed. Work will soon begin on the 45 cisterns which are to be a part of it. The Board of Supervisors has passed to print a resolution designating a bond election as the proper means of raising the $750,000 which is declared necessary for the preliminary purchases for the acquisition of the Sierra water supply. The total cost of a city distributing system, with 643 miles of mains and pipes, is estimated at $12,170,820. The Spring Valley Company's loss from pipes damaged in the earthquake is still large, but repairs are being made only where most necessary. The San Francisco Gas & Electric Company estimates its loss last year from a similar cause as 2,045,295 cu. ft. per mile of main, but it is claimed that the company is not in a financial condition to warrant extensive repairs, and very little work is being done. Present quotations on Cast Iron Pipe are, 4 to 6 in. $36; 8 to 12 in., $35; over 12 in., $34; Gas Pipe, $1 extra.

Merchant Pipe.—Business in Merchant Pipe has picked up considerably of late, and there is now a good inquiry from several parts of the State, though the greatest activity is in the South. The trade, however, is mostly of a jobbing character, as there are good-sized stocks on hand, and very little is being brought in from the East. Notwithstanding the liberal movement, there is a decided tendency among the jobbers to cut prices. The usual differential is quoted on jobbers' carloads:

	Steel. Black.	Steel. Galv.
	%	%
⅛ to ¼ in	56.5	40.5
⅜ in	58.5	44.5
½ in	60.5	48.5
¾ to 6 in	64.5	54.5
7 to 12 in	61.5	46.5
Extra strong, plain ends:		
⅛ to ⅜ in	49.5	37.5
½ to 4 in	56.5	44.5
4½ to 8 in	52.5	40.5
Double extra strong, plain ends:		
½ to 8 in	45.5	34.5

The Pacific Hardware & Steel Company is preparing to build a two-story warehouse on King street, near Seventh.

The Doak Sheet Company is about to erect a large warehouse at its plant at South City, near San Francisco.

J. C. Neale, constructing engineer of the Carnegie Steel Company, and Mr. Trist, are visiting the San Francisco office.

The Byron Jackson Iron Works has opened an office at 351-355 Market street.

The Pacific Iron & Smelting Company has been incorporated in Los Angeles, with a capital stock of $1,000,000, by Benton Flood, F. C. Rockwell, S. P. Savage, Henry Norton, H. L. Boyer, and W. A. Anderson.

The Great Western Power Company has started upon the preliminary work for the erection of a $2,000,000 auxiliary steam plant on its tract at Sessions Basin, in Oakland.

The Union Iron Works has taken the contract for repairs to the German steamer Anubis, which was almost destroyed on San Miguel Island, off the southern California coast, several weeks ago. The bid was $68,900, the work to be completed in 60 days. This is one of the largest jobs of the kind contracted in this city.

The Enterprise Foundry Company, San Francisco, has graded its property at Richmond, Cal., and will soon begin the erection of a new plant there.

The new shops of the mechanical engineering department of Stanford University, including the forge and foundry, machine shop, pattern shop, testing and metallurgical laboratories, have been completed. The shops cover 34,000 sq. ft. of floor space, and are said to be the equal in equipment of any in the country.

The Salt Lake Wire & Iron Works has been incorporated in Salt Lake City, Utah, with a capital of $20,000, by Seth Brown, Walter J. Eldredge, Robert E. Shepherd, William H. Pratt, and William G. Tovey.

Pittsburgh.

PARK BUILDING, September 30, 1908.—(*By Telegraph.*)

Pig Iron.—A local consumer has bought 5000 to 6000 tons of Basic Iron on the basis of $15.15, delivered, or $14.25 at Valley furnace. Part of the Iron was sold by a furnace that has an 80c. freight rate, netting the seller $14.35 at furnace. An Ohio Steel casting concern has bought 500 tons of Basic Iron for last quarter at slightly less than $14.25 at Valley furnace, and 500 tons for first quarter of next year at $14.35 at furnace. There is very little doing in Bessemer or Foundry Iron, but prices are fairly steady. We quote Standard Bessemer Iron at $15; Basic, $14.25; Malleable Bessemer, $14.50; No. 2 Foundry, $14.35 to $14.50, and Forge at $13.50, all at Valley furnace. The freight to Pittsburgh is 90c. a ton.

Steel.—We note a sale of 300 tons of small Billets at the usual differential over the price for base sizes. The forges are taking in a fair amount of Steel, but new orders in Sheet and Tin Bars are scarce and the mills are not taking in as much tonnage on old contracts as in recent weeks. We quote Bessemer and Open Hearth Billets, 3⅞ in. and larger, up to and including 0.25 carbon, $25; 0.26 to 0.60 carbon, $1 extra; over 0.60 carbon, $2 extra, all f.o.b. Pittsburgh. For Wheeling, Martins Ferry, Follansbee, Newcastle, Sharon, Steubenville and Washington (Pa.) delivery, half the freight, or 50c. additional, is charged. Sheet and Tin Bars in random lengths are $27, f.o.b. Pittsburgh. Forging Billets take $2 advance over Rolling Billets.

(*By Mail.*)

Pittsburgh this week is celebrating its sesquicentennial. Founded only 150 years ago, it has grown to be the greatest manufacturing center in the world, its products going to every civilized country. Statistics could be given showing the pre-eminence of Pittsburgh in the Steel world, but these have been printed so many times that they would be superfluous. The city was hard hit in the recent financial panic, and its manufacturing plants have been running to only partial capacity for about a year, but it will emerge from these depressing conditions before long, and has already started to do so. Business houses, office buildings, hotels and many private dwelling houses are gaily decorated as part of the celebration, and for the balance of the week business will be largely suspended. Many notable persons are in the city, including some direct descendants of William Pitt, the founder of Pittsburgh. Matters in the Steel trade show no important developments in the week under review. A slow but steady gain is observed in new orders in finished Iron and Steel, and some fairly large tonnage in Plates has been placed, with some more pending. The Pig Iron market is quiet, but some Basic has been taken by a local interest. Prices are only fairly strong, and it is reported that Basic has sold close to $14, Valley furnace. The Scrap trade is quiet as far as new business goes, but the tonnage available is rather light, and the market is firm. The Coke trade shows no improvement.

Ferromanganese.—In the past three or four weeks a leading Western consumer of Ferro has bought about 600 tons for forward delivery. The impression is strong that prices may be higher soon. We quote 80 per cent. foreign at $42.50 to $43, seaboard, for prompt shipment, the rate to Pittsburgh being $1.95 a ton. For future delivery from $1 to $2 more is asked.

Ferrosilicon.—The market is quite firm, and we quote 50 per cent. at $67 to $67.50, Pittsburgh, and note two sales of 25 tons each to local consumers at the lower price. The quotation of $57.50, Pittsburgh, on Ferrosilicon in this report last week was a typographical error.

Muck Bar.—This material continues very dull, and we do not hear of any sales. We continue to quote best grades, made from all Pig Iron, at nominally $25, Pittsburgh.

Wire Rods.—Following the recent active demand and fairly heavy sales, the market on Rods has quieted down and there is not much inquiry, consumers being pretty well covered for some time ahead. We are advised that prices are firm, and we quote Bessemer Rods at $33, Basic at $34 and Chain Rods $33, Pittsburgh.

Skelp.—Little new business is being placed, and prices are only fairly strong. We quote: Grooved Steel Skelp, 1.45c. to 1.50c.; Sheared Steel Skelp, 1.50c. to 1.60c.; Grooved Iron Skelp, 1.60c. to 1.70c., and Sheared Iron Skelp, 1.70c. to 1.75c., f.o.b. Pittsburgh.

Steel Rails.—Last week was the best week the Carnegie Steel Company has had in Light Rails for some time, having sold about 2200 tons. As yet there is nothing of moment doing in Standard Sections, only a few scattering orders ranging from 100 to 300 tons being placed. There is some specifying on contracts, but the tonnage is not heavy. The Carnegie Steel Company is making regular shipments of both Light Rails and Standard Sections abroad, and, in fact, its foreign trade in Rails has been quite heavy for some time. No. 1 Rail mill at Edgar Thomson shut down on Monday night, but will start again Sunday night next if sufficient tonnage accumulates in the meantime. Prices on new Light Rails, which are sometimes shaded from $1 to $2 a ton for rerolled Rails, are as follows: $25 for 25 to 45 lb. Sections, with $1 advance for 20 lb., $2 advance for 16-lb., and $3 advance for 12-lb. Standard Sections are $28, at mill, and Angle Splice Bars, 1.65c., at mill.

Plates.—The Carnegie Steel Company has taken a contract for 5000 to 6000 tons of Plates and Shapes for two Ore boats to be built by the American Shipbuilding Company. One of these boats is for the Pitt Iron Mining Company, owned by the La Belle Iron Works, Steubenville, Ohio, and these works will furnish the Plates for it of such sizes as they roll in their own Plate mill, the balance to be furnished by the Carnegie Steel Company. New orders are light, and are mostly in small lots for actual needs. Two or three Plate mills that do not roll a full assortment of sizes are cutting prices from $1 to $2 a ton, and in most cases this competition is being met by the larger mills. Regular prices are as follows: Tank Plates, ¾ in. thick, 6¼ in. up to 100 in. wide, 1.60c., base, at mills, Pittsburgh. Extras over this price are as follows:

Tank, Ship and Bridge quality, ¼ in. thick on edges, 100 in. wide, down to but not including 6 in. wide, is taken as base.

Steel Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, shall be considered ¼-in. Plate. Steel Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Steel Plates over 72 in. wide ordered less than 11 in. per square foot down to the weight of 3-16-in. shall take the place of 3-16-in.

Percentages as to overweight on Plates, whether ordered to gauge or weight, to be governed by the Association of American Steel Manufacturers' Standard Specifications.

Gauges under ¼-in. to and including 3-16-in. Plates on thin edges	$0.10
Gauges under 3-16-in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.)	.10
Complete Circles	.20
Boiler and Flange Steel Plates	.10
"A. B. M. A." and ordinary Firebox Steel Plates	.20
Still Bottom Steel	.30
Marine Steel	.40
Locomotive Firebox Steel	.50
Shell grade of Steel is abandoned.	
For widths over 100 in. up to 110 in	.05
For widths over 110 in. up to 115 in	.10
For widths over 115 in. up to 120 in	.15
For widths over 120 in. up to 125 in	.25
For widths over 125 in. up to 130 in	.50
For widths over 130 in	1.00

TERMS.—Net cash 30 days. Pacific Coast base, 1.50c., f.o.b. Pittsburgh.

Structural Material.—No large contracts have been placed the past week, and there is only a fair amount of new inquiry. The McClintic-Marshall Construction Company has taken a new building and storage bins for the International Acheson Graphite Company, at Niagara Falls, N. Y., 300 tons; also a new mill building for the Wisconsin Steel Company, 115 ft. wide and 600 ft. long, about 400 tons, and a new mill building for the Ohio Seamless Tube Company, at Shelby, Ohio, 400 to 500 tons. We quote,

f.o.b. mill, Pittsburgh: I-Beams, H-Beams and Channels, 3 to 15 in., inclusive, 1.60c., net; Beams over 15 in., 1.70c., net., Angles, 3 to 6 in., inclusive, ¼-in. and up, 1.60c., net; Angles, over 6 in., 1.70c., net; Angles, 3 x 3 in. and up, less than ¼ in., 1.50c., base, half extras, Steel Bar card; Tees, 3 in. and up, 1.65c., net; Zees, 3 in. and up, 1.60c., net; Angles, Channels and Tees under 3 in., 1.50c., base, half extras, Steel Bar card; Deck Beams and Bulb Angles, 1.90c., net; Hand Rail Tees, 3c., net; Checkered and Corrugated Plates, 3c., net.

Sheets.—The contract for 450 to 500 tons of Galvanized Sheets for the Pressed Steel Car Company was taken by the American Rolling Mill Company, Middletown, Ohio, and will be Sheets rolled from its American genuine ingot Iron. We are advised that the demand for both Black and Galvanized Sheets, particularly Corrugated, is showing steady betterment, and recently some nice orders for Corrugated Sheets have been placed, and at practically regular prices. The American Sheet & Tin Plate Company is operating to about 65 per cent. of capacity, and the outside mills are running at about the same rate. Prices are fairly steady, being slightly shaded only on desirable tonnage and **mostly for prompt shipment.** For shipment from mill, regular prices, which are shaded by some mills from $1 to $2 a ton, are as follows: Blue Annealed Sheets, No. 10 and heavier, 1.80c.; Nos. 11 and 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 2c.; Box Annealed, Nos. 17 to 21, 2.25c.; Nos. 22 to 24, 2.30c.; Nos. 25 and 26, 2.35c.; No. 27, 2.40c.; No. 28, 2.50c.; No. 29, 2.60c.; No. 30, 2.70c. Galvanized Sheets: Nos. 10 and 11, 2.45c.; Nos. 12 and 14, 2.55c.; Nos. 15 and 16, 2.65c.; Nos. 17 to 21, 2.80c.; Nos. 22 and 24, 2.95c.; Nos. 25 and 26, 3.15c.; No. 27, 3.35c.; No. 28, 3.55c.; No. 29, 3.70c.; No. 30, 3.95c.; No. 28, Painted Roofing Sheets, $1.75 per square, and Galvanized Roofing Sheets, No. 28, $3.10 per square, for 2½-in. corrugations. These prices are subject to a rebate of 5c. per 100 lb. to the large trade under the usual conditions, jobbers charging the usual advances for small lots from store.

Tin Plate.—Practically no new orders are being placed, but shipments are still being made on contracts placed some time ago, all of which are not yet filled. It is estimated that only about 40 per cent. of the entire Tin Plate capacity is active at present. Prices on Tin Plate are still irregular and are being shaded to some extent on desirable business. The regular price of Tin Plate is $3.70 for 100 lb. Cokes, 14 x 20, f.o.b. Pittsburgh, terms 30 days, less 2 per cent. off for cash in 10 days, this price being subject to the usual rebate of 5c. per base box in large lots.

Hoops and Bands.—A fair run of new orders is being placed, and with specifications against contracts coming in steadily, the Hoop mills are fairly busy. We are advised that regular prices are being maintained. The Clark Steel Hoop Company is going ahead with its project of building a Hoop mill at Punxsutawney, Pa., and has placed contracts for considerable machinery with Pittsburgh concerns. We quote: Steel Hoops, 1.80c., base, full Hoop card prices; Steel Bands, 1.40c., base, half Steel card extra, all f.o.b. cars, Pittsburgh, in carload lots, for delivery during 1908.

Bars.—New orders are rather light, but specifications against contracts are coming in freely, and shipments by the mills this month compare well with August, and will only be slightly less. Most leading consumers covered their requirements some time ago, and orders now coming in are from the small trade, and mostly for prompt shipment, which the mills are able to make. We note a moderate demand for Iron Bars, but consumers of both Iron and Steel are not disposed to stock ahead, new orders being only for actual needs. We are advised that regular prices are being maintained. We quote Iron Bars at 1.40c., base, for Pittsburgh delivery, and 1.35c., base, for Western points, to which freight is added, except Chicago, the price for which is 1.50c., delivered. We quote Steel Bars at 1.40c., Pittsburgh, for base sizes.

Merchant Steel.—Specifications from implement makers and other leading consumers are being received by the mills in fairly large volume, but as a rule consumers are not stocking up, but are taking in material only as needed for actual requirements. Some large orders for Shafting have recently been placed by leading consumers on which specifications are coming in quite freely. Prices on Shafting are fairly well maintained, only the very large orders being allowed an extra discount over regular prices. We quote Cold Rolled Shafting at 57 per cent. off in carloads and 52 per cent. in less than carloads, delivered in base territory. Prices on Merchant Steel are being shaded, regular quotations being as follows: Smooth Finished Machinery Steel, 1.80c. to 1.90c.; Flat Sleigh Shoe, 1.75c. to 1.85c.; Cutter Shoe Steel, 2.15c. to 2.25c.; Toe Calk, 1.90c. to 1.95c.; Railroad Spring Steel, 1.60c. to 1.75c., the higher prices being for Pennsylvania Railroad analysis. Carriage Spring Steel is 1.80c.; Tire Steel, Iron finish, 1½ x ½ in. and heavier, 1.40c.; under 1½ in., 1.55c. Planished Tire Steel is 1.60c., all f.o.b. at mill.

Merchant Pipe.—Conditions in the Pipe market show steady betterment, new orders being steadily larger and output and shipments by the mills are heavier. The order for 20,000 tons of Steel Pipe placed by the Columbia Gas & Electrical Company for conveying gas from the West Virginia fields to Cincinnati was really placed early in the year, but the financial plans were arranged only recently. Deliveries on this order have been going forward for some time. We are advised that prices on Steel Pipe are being absolutely maintained, but on Iron Pipe are being shaded to some extent. Discounts on Steel Pipe, ¾ to 6 in., to the large trade are 76 and 5 per cent. off list. Regular discounts are as follows:

Merchant Pipe.

	Jobbers, carloads, Steel.	
	Black.	Galv.
	%	%
⅛ to ¼ in.	67	51
⅜ in.	69	55
½ in.	71	59
¾ to 6 in.	75	65
7 to 12 in.	72	57
Extra strong, plain ends:		
⅛ to ⅜ in.	60	48
½ to 4 in.	67	55
4½ to 8 in.	63	51
Double extra strong, plain ends:		
½ to 8 in.	56	45

Discounts on Genuine Iron Pipe are as follows:

	Black.	Galv.
	%	%
⅛ to ¼ in.	65	..
⅜ in.	67	53
½ in.	69	57
¾ to 6 in.	73	63
7 to 12 in.	70	55
Extra strong, plain ends:		
⅛ to ⅜ in.	58	46
½ to 4 in.	65	53
4½ to 8 in.	61	49
Double extra strong, plain ends:		
½ to 8 in.	54	43

Boiler Tubes.—There is a little more activity in railroad repair work, and some small orders are being placed by the railroads for Tubes, but buying as a whole is light. The demand for Merchant Tubes is also quiet. There is still some unevenness in prices, regular discounts being shaded to some extent. For Merchant Tubes in small lots, on which an extra 5 per cent. is allowed in carloads, discounts are as follows:

Boiler Tubes.

	Iron.	Steel.
1 to 1½ in.	42	47
1¾ to 2¼ in.	42	59
2½ in.	47	61
2¾ to 5 in.	52	65
6 to 13 in.	42	59

2½ in. and smaller, over 18 ft. long, 10 per cent. net extra.
2¾ in. and larger, over 22 ft. long, 10 per cent. net extra.

Railroad Spikes.—No large orders have been placed since the Great Northern business was given out, but we are advised that one or two railroads are inquiring for a moderate tonnage in Spikes, but it is not probable there will be any heavy buying for this year, as the season for track laying is nearly at an end. We note a continued active demand for the smaller sizes of Spikes, and two of the local mills have work ahead for about two months. We quote: Standard sizes, 4½ x 9-16 in., at $1.70, and the smaller sizes at $1.80 per 100 lb. in carload and larger lots, with an advance of 5c. per 100 lb. for less than carload, f.o.b. Pittsburgh.

Spelter.—The market is quiet as regards demand, but prices are fairly steady. Prime Western makes are quoted at about 4.55c., East St. Louis, but on a firm offer it is probable that 4.50c. could be done, which is equal to 4.62½c., Pittsburgh.

Iron and Steel Scrap.—An unusual feature of the Scrap market at present is that Heavy Steel Scrap is now quoted at higher prices than Basic Iron, and is less than $1 a ton lower than Bessemer Iron. The available tonnage in all kinds of Scrap is not large, because the mills have been running lightly for nearly a year and have not been making as much Scrap. The railroads are not offering as much Old Material as they did some time ago. With these conditions, dealers that have Scrap in yards are firm in their ideas as to prices and are not pressing the market to make sales. In fact, some dealers believe that prices will be better before long, and are inclined to keep their Scrap, feeling they will get higher prices for it before long. We have advanced prices on Heavy Steel Scrap, and note that this material is very firm. One leading consumer has recently bought from 4000 to 5000 tons of Heavy Steel Scrap through a local dealer, paying $15 and higher for it. Dealers' quote about as follow per gross ton: Heavy Steel Scrap for Pittsburgh, Sharon, Follansbee, Monessen and Steubenville delivery, $15 to $15.25, while Heavy Steel Scrap for hand charged Open Hearth furnaces, pieces weighing 10 lb. minimum to 300 lb. maximum, is 75c. to $1 a ton higher; Cast Iron Borings, $9 to $9.25; Bundled Sheet Scrap, $12.25 to $12.50; No. 1 Railroad Wrought Scrap, $16.50 to $16.75; No. 1 Busheling Scrap, $13.75 to $14; No. 2, $10.25 to $10.50; No. 1 Cast Scrap, $14.50 to $14.75; Sheet Bar Crop Ends, $17.50 to $18; Iron Axles, $22.50 to $23; Low Phosphorus Melting Stock, 0.035 and under in phosphorus, $19; Rerolling Rails, $16 to $16.25; Steel Axles, $19 to $19.25; Machine Shop Turnings, $9.75 to $10; Grate Bars,

$12.25 to $12.50; Old Car Wheels, $15 to $15.50; Railroad Malleable, $14 to $14.25. We note sales of 4000 tons of Heavy Steel Scrap at $15 to $15.25, delivered in Pittsburgh District, and about 2000 tons for Sharon, Pa., delivery at about the same prices. Also a sale of 200 tons of Cast Iron Borings at about $9 and 250 tons of Sheet Bar Crop Ends at about $17.50, delivered.

Coke.—While a water shortage exists at many Coke plants, the output and shipments last week showed a slight gain over the previous week. At present between 45 and 50 per cent. of the total ovens in the Upper and Lower Connellsville regions is in operation, averaging about five days a week, while in outside Coke districts about the same rate of operation prevails. Strictly Connellsville Furnace Coke for prompt shipment is still offered as low as $1.50 a ton, at oven, while other grades of Furnace Coke can be had as low as $1.40 for prompt delivery. For shipment over balance of this year, Connellsville Furnace Coke is held at $1.60 to $1.65, and for first half of 1909 from $1.75 and as high as $1.90 is quoted, but the latter is a prohibitory price. Connellsville 72-hr. Foundry Coke is held at about $2.25, at oven, but outside makes are offered at $2 and lower.

Cincinnati.

CINCINNATI, OHIO, September 30, 1908.—(*By Telegraph.*)

Notwithstanding trade lassitude generally, because of ante-election excitement and the prevailing policy of waiting for developments, conditions in this market are considerably better as the month closes than had been predicted by manufacturers and dealers. A better feeling is observed among machine tool manufacturers, and some accumulated inquiries indicate a good beginning for October. Pipe makers in this vicinity are running about five-sixths of their capacity. Finished material is dull with dealers, but specifications for Steel Bars, Nuts, Bolts, Turnbuckles, &c., are reported good, and the month closes quite satisfactorily to the sales agencies. In Scrap there is some select Railroad Wrought selling, and in a few cases bringing from $1 to $1.50 above market quotations. In general the outlook in the Iron and Steel trade is quite promising, the sluggishness of the present being attributed solely to political excitement. Correspondence with large establishments indicates that an early revival is imminent if the election results are favorable.

Pig Iron.—The week has been barren of new deals, and some negotiations begun earlier in the month are still pending. Southern Iron still shows strength for the balance of the year, and Northern is holding its own, although the minimum quoted price of $15, Ironton, is and has been shaded to $14.75 for prompt delivery. Rumors of a large tonnage of Northern Foundry Iron negotiated for delivery to a central plant of the largest Pipe interest at an attractive price are current, although not confirmed. Considerable resale Iron of various kinds has changed hands during the week, some of it on exchange propositions and some by direct sale. Louisville figures in this connection, the Iron coming from a large Southern interest. A sale to a local Steel maker included 100 tons of Virginia Basic and some Foundry, the whole amounting to 400 tons, which had been tied up in receivership proceedings. A north Central Ohio Steel Castings concern bought to-day 500 tons of Northern Basic for delivery over the balance of the year at about $14.50, at furnace. The Central Ohio concern mentioned last week as wanting 2000 tons of Malleable for second quarter next year is still negotiating. The quoted price is about $15, at furnace. An Indiana manufacturer of agricultural implements is seeking a price on 400 tons of Foundry Iron for the first half. The inquiry for low grades has fallen off, and little is heard about them. High Silicon Ohio Silveries are still quotable at $18.50 for eight per cent. The settlement of labor troubles in Alabama has improved all furnace conditions. While most large interests there are holding for $13 for last quarter and $14 and $15 for the first quarter, in northern Alabama and Tennessee conditions are more favorable for lower prices. Preparations are about concluded for blowing in the old Williamson Furnace at Birmingham. Arrangements were made several months ago, but were held up pending more favorable trade conditions. For prompt delivery and balance of the year, we quote, f.o.b. Cincinnati, the freight rate being $3.25 from Birmingham and $1.20 from the Hanging Rock District, as follows:

Southern Coke, No. 1	$16.25 to $16.75
Southern Coke, No. 2	15.75 to 16.25
Southern Coke, No. 3	15.25 to 15.75
Southern Coke, No. 4	15.00 to 15.50
Southern Coke, No. 1 Soft	16.25 to 16.75
Southern Coke, No. 2 Soft	15.75 to 16.25
Southern Coke, Gray Forge	14.25 to 14.75
Ohio Silvery, 8 per cent. Silicon	19.70
Lake Superior Coke, No. 1	16.45 to 16.95
Lake Superior Coke, No. 2	15.95 to 16.45
Lake Superior Coke, No. 3	15.45 to 15.95
Standard Southern Car Wheel	22.25 to 22.75
Lake Superior Car Wheel	21.75 to 22.25

(*By Mail.*)

Coke.—The only change to be noted in conditions in the Coke market is perhaps a little better inquiry for next year delivery of Furnace grades. Nothing is heard of Foundry business beyond an occasional sale of a carload or so. Connellsville Furnace Coke for the first half is quotable at $1.85 to $2.50, at oven, there being an unusually broad range between grades. Virginia Furnace Coke is selling at about $1.75, at oven, and the range is about $1.75 to $1.85. Furnace Coke is moving well on contract. The prolonged drought is seriously affecting the smaller producers.

Finished Iron and Steel.—Dealers report the market unusually quiet. Steel Bars are just a trifle more active, and the jobbers from medium and small sized towns are buying some needed lines. Business in most other lines is very quiet, and collections are not good. Some fairly good sales are reported of friction clutches and chucks of various kinds for tool manufacturers. Dealers' prices to the trade, f.o.b. Cincinnati, are as follows: Iron Bars, carload lots, 1.65c., base, with half extras; small lots from store, 1.85c., base, half extras; Steel Plates, carload lots, 1.75c., base, with half extras; small lots from store, 1.85c., base, half extras; Base Angles, carload lots, 1.85c., base; small lots from store, 2.10c.; Beams, Channels and Structural Angles, 1.85c., base; small lots from store, 2.10c.; Plates, ¼-in. and heavier, carload lots, 1.85c.; small lots from store, 2c.; Blue Annealed Sheets, heavy, No. 16, carload lots, 2.15c.; small lots from store, 2.50c.; No. 14, carload lots, 2.05c.; small lots from store, 2.40c.; No. 10 and heavier, carload lots, 1.95c.; small lots from store, 2.20c.; No. 12, carload lots, 2c.; small lots from store, 2.30c.; Sheets (Light), Black, No. 28, carload lots, 2.65c.; Galvanized Sheets, No. 28, carload lots, 3.70c.; Steel Tire, 4-in. and heavier, carload lots, 1.95c.; Plates, 3-16 and No. 8, carload lots, 2c.; small lots from store, 2.20c.

Old Material.—The Scrap market is featureless. Political conditions seem to have effectually paralyzed this division of trade, although some dealers are still manipulating for higher prices. There is a fairly good inquiry for Relaying Rails from the West and Southwest, and some large dealers are asking $23 for 60-lb. Dealers are quoting to the trade about as follows, f.o.b. Cincinnati:

No. 1 R. R. Wrought, net ton	$12.50 to $13.50
Cast Borings, net ton	5.00 to 5.50
Heavy Melting Steel Scrap, gross ton	14.00 to 15.00
Steel Turnings, net ton	6.00 to 7.00
No. 1 Cast Scrap, net ton	12.00 to 13.00
Burnt Cast, net ton	9.00 to 10.00
Old Iron Axles, net ton	16.50 to 17.50
Old Iron Rails, gross ton	15.00 to 16.00
Old Steel Rails, short, gross ton	13.00 to 14.00
Old Steel Rails, long, gross ton	12.50 to 13.50
Relaying Rails, 56 lb. and up, gross ton	20.50 to 21.50
Old Car Wheels, gross ton	13.00 to 14.00
Low Phosphorus Scrap, gross ton	14.00 to 15.00

Birmingham.

BIRMINGHAM, ALA., September 28, 1908.

Pig Iron.—The aggregate sold the past week is placed at approximately 10,000 tons, or equivalent to the sales of the week preceding, but the outlook for the immediate future is not so promising as at the time of last report. The established schedule of quotations on such deliveries as have been in demand are being adhered to, and but slight shading, in order to effect recent sales, is indicated, although the available tonnage for delivery during the remainder of the year is practically in the hands of one concern. It is also a fact that but a small proportion of business recently transacted has come from sources out of the local territory. As to what extent such requirements have been met, a definite statement is not warranted. No inquiries of note are pending, and in the case of probably the largest melter, provision is known to have been made for some months' operations. There is no evidence of a disposition among producers to make concessions at competitive points with Northern and Eastern concerns, but announcement is made that an additional furnace will be blown in not later than October 15. Of the latest sales, only two were for 1909 delivery. The transactions mentioned involved 1000 tons each for the first quarter, and the price consideration was a basis of $13, Birmingham, for strictly No. 2 Foundry. An effort within the week to secure 1200 tons of Etowa No. 2 at $12.50, Birmingham, for delivery covering the next six months, is known to have been unsuccessful. Clifton High Manganese Iron of a No. 2 Silicon content, recently sold at $13.50, Birmingham. The same brand with high Silicon sold for $14.50, Birmingham. An inquiry for 1000 tons of Charcoal Iron, shipment to commence immediately, is pending. This grade is quoted at $20, f.o.b. furnace, but concessions could probably be had on a limited quantity of Soft brands.

Cast Iron Pipe.—It is learned that the United States Cast Iron Pipe & Foundry Company was the successful bidder on approximately 14,000 tons of Water Pipe for the city of Cienfuegos, Cuba. The price at which this contract was awarded is not given out, but it is understood that provision was made for 10 per cent. additional tonnage to take care of small sized Pipe and special fittings required. The following lettings have been advertised since last report:

10 miles of Water Pipe, for the city of Haddonfield, N. J., bids to be opened October 6; approximately 800 tons of 6 to 42 in. Water Pipe for Kansas City, Mo., to be awarded October 8; a large contract to cover 42-in. Water Pipe for Baltimore, Md., to be placed October 14, and 37 miles of 6 to 20 in. Water Pipe for Passaic, N. J., bids to be opened October 15. The city of Alleghany, N. Y., is also to enter the market for Water Pipe early in October. In view of recent lettings and the improvement in the outlook, prices are firmer, and we quote as follows, per net ton, f.o.b. cars here: 4 to 6 in., $24; 8 to 12 in., $23; over 12 in., average, $22. with $1 per ton extra for Gas Pipe. These quotations are probably shaded on large contracts.

Old Material.—The business transacted the past week was principally among dealers. Prices are unchanged, but the demand does not afford additional strength. The conservative course formerly adopted by the trade is apparently being adhered to, and in but few cases has other than a small proportion of inquiries resulted in sales. We quote dealers' asking prices as follows, per gross ton, f.o.b. cars here:

Old Iron Rails	$14.50 to $15.00
Old Iron Axles	15.50 to 16.00
Old Steel Axles	13.00 to 13.50
No. 1 Railroad Wrought	13.50 to 14.00
No. 2 Railroad Wrought	10.50 to 11.00
No. 1 Country Wrought	11.00 to 11.50
No. 1 Machinery	11.00 to 11.50
No. 1 Steel	9.50 to 10.00
Stove Plate and Light Cast	9.50 to 10.00
Cast Borings	5.00 to 5.50

Philadelphia.

PHILADELPHIA, PA., September 29, 1908.

The volume of business transacted in the local Iron market has been rather light. The buying movement has quieted down materially. Both buyers and sellers are pursuing a conservative policy, and little business beyond that required by current needs has been done. Both sides are awaiting further developments, and not a great deal of activity is expected until after the Presidential election. The demand for Finished Materials shows no marked improvement but continues on a fairly even basis. The outlook in this direction is more encouraging, particularly for Plates and Shapes, as a large amount of work in which these materials enter extensively is under consideration. Billets and Sheets show no material betterment. Iron Bars are just about holding their own, while Old Material has been less active. The drought, which threatened to interfere seriously with business in this territory, was broken by rains in the past few days.

Pig Iron.—Sales have been largely in small lots, for prompt and fourth quarter delivery, and have been pretty generally confined to the Foundry grades. The market on the whole has been quiet, and the tendency of buyers is to cover only their needs for the immediate future, and while inquiries for forward Iron are coming out freely, there is not the same disposition shown in placing orders. This, however, coincides with the policy of the majority of sellers, who are not anxious to take orders for much tonnage for forward shipment at to-day's price level, some, in fact, still refusing to quote for next year's deliveries. While the individual orders placed are usually small, the aggregate is comparatively large, and a number of sellers note a continued gradual gain in the tonnage taken. Shipments are being taken quite freely and stocks on the majority of furnace banks continue to decline. Eastern Pennsylvania producers maintain a very strong front. Prices are being firmly held, and while $17 is being pretty generally done for No. 2 X Foundry, delivered in this vicinity, $16.75 is still being accepted for several good brands for delivery during the last quarter. For next year's delivery quotations range from 25c. to 50c. above present prices, at which figures some moderate sales have been made. There have been some sales of low grade Foundry Irons, one lot of 1000 tons being reported at about $16, delivered. The Pipe foundries are still in the market and would take some fair tonnages of off grade Irons, but their ideas of prices are not being met by sellers, and the business is held in abeyance. Virginia Foundry Irons have been rather quiet. The demand for prompt Iron is not so active, while sellers as a rule are not anxious for orders for next year's delivery, but prices are being maintained and what little business has been done has been at full figures. The demand for Southern Foundry Iron has diminished, the present price level practically putting it out of this market. Forge Iron has been in fair demand and the outlook for an increased consumption appears favorable. For early delivery this grade is rather scarce and some producers have no tonnage to offer. Prices are strong and have an advancing tendency. One seller who disposed of 600 tons a few days ago at $15.50, delivered, is now quoting $15.75 on moderate tonnages, and refuses to quote on large lots. No further sales of Basic Iron have been reported. Sellers are holding firmly at $16, for delivery during either the last quarter of this year or the first quarter of next, and while practically all the consumers have covered for their needs for the balance of the year, several large buyers are in the market for Basic for next year's delivery, but as yet no business has been placed. Low Phosphorus Iron seems to be uncalled for and quoted figures for this grade are by no means strong. Notwithstanding the decreased buying recently, the situation is decidedly strong as far as prices are concerned. The consumption of Foundry Iron appears to be increasing slowly, and while a waiting policy is expected to prevail to a considerable extent during the month of October, pending the outcome of the national election, the trade expects a strong buying movement before the close of the year. Prices are unchanged, and for delivery in buyers' yards, eastern Pennsylvania and nearby territory, during the balance of the year, range about as follows:

Eastern Pennsylvania, No. 2 X Foundry	$16.75 to $17.00
Eastern Pennsylvania, No. 2 Plain	16.25 to 16.50
Virginia, No. 2 X Foundry	17.00
Virginia, No. 2 Plain	16.75
Gray Forge	15.50 to 15.75
Basic	16.00
Low Phosphorus	20.00 to 20.50

Ferromanganese.—The market has been extremely quiet, no sales of any importance being reported. Prices are a trifle stronger, and for delivery over the first half of next year $43.50 to $44.50, Baltimore, is quoted.

Plates.—Current business continues rather irregular. About an average volume comes out on the whole, however, and the outlook for the future is more encouraging. The bulk of the business placed recently has been small individually, although some good sized contracts for boats, bridges and water pipe are being figured on. Prices for delivery in this territory are firm and range as follows:

	Carloads. Cents.	Parts carload. Cents.
Tank, Bridge and Boat Steel	1.75	1.80
Flange or Boiler Steel	1.85	1.95
Commercial Firebox	1.95	2.00
Marine	2.15	2.20
Locomotive Firebox Steel	2.25	2.30

The above are base prices for ¼-in. and heavier. The following extras apply:

	Extra per 100 lb.
3-16-in. thick	$0.10
Nos. 7 and 8, B. W. G.	.15
No. 9, B W. G.	.25
Plates over 100 to 110 in.	.05
Plates over 110 to 115 in.	.10
Plates over 115 to 120 in.	.15
Plates over 120 to 125 in.	.25
Plates over 125 to 130 in.	.50
Plates over 130 in.	1.00

Steel Billets.—Enough business comes out from day to day to enable mills in this territory to maintain their present curtailed rate of production. Indications for any material improvement are lacking, and the trade is not particularly hopeful regarding the future. For delivery in this territory Ordinary Rolling Steel is quoted at $26.20, with Forging Steel at $28.20, subject to the usual extras for high carbons and special sizes.

Structural Material.—There seems to be a shade better demand, but the orders coming out are usually confined to small propositions. Transactions covering 2800 tons of bridge work taken for a mill in this territory are reported. Some small building work has also been given out, among which was a new machine and pattern shop for the Tropenas Steel Company, New Castle, Del., which went to the McClintic-Marshall Company. A number of good propositions are pending, but develop slowly. Quotations are unchanged, 1.75c. to 1.90c. being named, according to specification, for deliveries in this territory.

Sheets.—A slightly better demand is reported. Orders, however, are still small, individually, being mainly for prompt shipment. In the aggregate, they are sufficient to keep mills fairly well occupied. Prices for mill shipments range about as follows, a tenth extra being added for small lots: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 to 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—Business has been on a rather small scale. The demand is somewhat irregular, and mills are not much more than holding their own. Prices are unchanged, and while some makers are anxious to advance prices, which are now quoted at 1.45c. to 1.50c., delivered, in this territory, their views are not met by other producers. Steel Bars are dull, at 1.56c., delivered, with Rerolled Bars at 1.50c., delivered, in this vicinity.

Coke.—There has been no tonnage of importance taken, but the market appears to be somewhat firmer. Recent sales have been small at unchanged prices. Foundry Coke is quoted at $2 to $2.25, at oven, with Furnace Coke ranging from $1.50 to $1.75. For delivery in this territory, the following range of prices is named:

Connellsville Furnace Coke	$3.65 to $3.90
Foundry Coke	4.15 to 4.40
Mountain Furnace Coke	3.25 to 3.50
Foundry Coke	3.75 to 4.00

Old Material.—Business has been practically at a standstill. Mills would buy in a number of cases at the inside figures, but dealers hold pretty generally at outside quotations, particularly in Heavy Melting Steel. Sales have been light and both buyers and sellers are awaiting further developments. Nominal quotations for delivery in buyers'

yards, eastern Pennsylvania and adjoining territory, are quoted as follows:

No. 1 Steel Scrap and Crops	$15.00 to $15.50
Low Phosphorus	18.50 to 19.00
Old Steel Axles	21.50 to 22.00
Old Iron Axles	22.50 to 23.00
Old Iron Rails	20.50 to 21.00
Old Car Wheels	15.00 to 15.50
Choice No. 1 R. R. Wrought	18.25 to 18.75
Machinery Cast	15.25 to 15.75
Railroad Malleable	13.50 to 14.00
Wrought Iron Pipe	14.25 to 14.75
New Bundled Sheets	13.50 to 14.00
No. 1 Forge Fire Scrap	12.00 to 12.50
No. 2 Light Iron	8.75 to 9.25
Wrought Turnings	11.50 to 12.00
Stove Plate	13.00 to 13.50
Cast Borings	11.25 to 11.75
Grate Bars	13.50 to 14.00

The M. H. Treadwell Company of New York, N. Y., and Lebanon, Pa., has opened a local office in Philadelphia in charge of W. H. Worrilow, general sales agent, 1029 Real Estate Trust Building. Mr. Worrilow, who was formerly representative of the Solid Steel Casting Company, Chester, Pa., will also look after the local business of the Lebanon Steel Casting Company, Lebanon, Pa., and the Stoever Foundry & Mfg. Company, Myerstown, Pa.

Cleveland.

CLEVELAND, OHIO, September 29, 1908.

Iron Ore.—Buying is still going on at a moderate rate. One producer sold 40,000 tons during the week, and smaller sales were made by other producers, practically all non-Bessemer. A few inquiries are pending, but sales that are made from now on are expected to be only for quite small tonnages. Ore firms are getting pretty well cleaned up on their shipments, and the movement will begin to fall off after this week. One or two concerns have scarcely any more to ship, and others expect to be entirely cleaned up about November 1. The Steel Corporation will continue to move considerable Ore in October, and expects that its shipments that month will about equal those of September. Owing to the crowded conditions of the docks, practically all Ore is going forward at present directly to the furnace yards. In spite of the heavy falling off in the movement of Ore this season as compared with a year ago, it is estimated that the total tonnage on the dock piles and in the furnace yards at the close of navigation will be considerably larger than at the same time in any previous year. The Steel Corporation will have more Ore on dock piles and in yards on December 1 than ever before at the close of navigation and the same is said to be true of many other consumers. The record breaking movement of 1907 was followed by the slump, and as a result of the falling off in consumption the dock piles were still well filled at the opening of navigation this year. This accounts for the large tonnage of available Ore at the end of the season of 1908. Prices at Lake Erie docks, per gross ton, are as follows: Old Range Bessemer, $4.50; Mesaba Bessemer, $4.25; Old Range non-Bessemer, $3.70; Mesaba non-Bessemer, $3.50.

Pig Iron.—The market is rather quiet, although some fair sized lots of Foundry Iron were sold during the week. Pending inquiries are scarce. Prices remain stationary, with no indication of becoming firmer. Valley furnaces continue to quote No. 2 Foundry at $14.50, at furnace, for the balance of the year, but this price is being shaded. Local furnaces quote No. 2 Foundry at $15, at furnace, but this is being shaded to $14.75 for outside shipments. Some furnace interests are showing more eagerness to take on business for the first half, and at least one producer is quoting $14.50 for No. 2. We note the sale of 1200 tons of No. 2 Foundry to a northern Ohio consumer for the last quarter. Other sales in this territory during the week were mostly small lots. The market in the Toledo territory continues fairly active. We note the sale of two lots of No. 2 Foundry, aggregating 1400 tons, for the last quarter, and one 1000-ton lot for the first quarter, at $15 to $15.25, Toledo furnace. Basic Iron producers report more activity in the market. One important consumer has had an inquiry out for a large tonnage of Basic, but this interest is said to have bought so far only for its immediate requirements. Another inquiry is pending for a round lot of Basic. A central Ohio Malleable foundry has an inquiry out for 2000 tons of Malleable Bessemer for the second quarter, and is expected to make the purchase in a day or two. Dover Furnace of the Penn Iron & Coal Company, Canal Dover, went out of blast September 20. The River Furnace of the Upson Nut Company, Cleveland, will go out of blast September 30 for relining. For prompt shipment and for the balance of the year we quote, delivered, Cleveland, as follows:

Bessemer	$15.90 to $16.40
Northern Foundry, No. 1	15.50 to 15.90
Northern Foundry, No. 2	15.25 to 15.50
Northern Foundry, No. 3	14.90 to 15.25
Southern Foundry, No. 2	16.85 to 17.35
Gray Forge	14.25 to 14.50

Coke.—The market continues lifeless, with no change in prices. The only sale of Furnace Coke reported was to a local furnace interest for a portion of its requirements for the balance of the year. We quote Standard Connellsville Furnace Coke at $1.50 to $1.55, at oven, for spot shipment, and $1.65 to $1.75 for the balance of the year. Connellsville 72-hr. Foundry Coke is quoted at $2 to $2.25, at oven, for spot shipment and on contract.

Finished Iron and Steel.—Although a few small contracts were placed during the week new business was light. The effect of the political campaign is being felt considerably, and many consumers are disposed to hold off buying until after election. Specifications on contracts are holding up well. One or two mill representatives report a falling off in the number of orders, but such as they have received have been for larger amounts so that the tonnage has been maintained. Although the contracts placed in this territory in September will run considerably below those of August the actual tonnage ordered on contracts will far exceed that of August. The most important development of the week was the practical closing by the American Shipbuilding Company of a contract for two lake boats to be built for an Ohio Iron and Steel interest. The two boats will require about 8000 tons of Plates and Structural Shapes. A portion of the material will be furnished by the purchaser of the boats. Specifications came during the week from the American Shipbuilding Company for 2900 tons of Plates and Shapes for the two boats that are being built for the Pittsburgh Steamship Company. New contracts are mostly for Steel Bars. The largest volume of specifications on contracts is also for Steel Bars. The demand for Iron Bars is still light, orders being mostly for immediate needs. Railroads are buying only in small quantities. Prices of Bar Iron are slightly firmer, owing to the maintenance of high prices on Scrap. The demand for Plates is very light, orders being for small lots for immediate requirements. Some mills continue to shade prices $2 a ton. The Sheet market is slightly firmer, but prices are still being shaded. The demand for Structural Material is only fair. While there is considerable small Structural work on hand, no projects are being developed in this territory that will require a large tonnage, and it is not expected that any important building projects will be started this season. Very low prices are still being quoted by fabricators on Structural work. The National Iron & Wire Company, Cleveland, has secured the contract for the erection of a new building for the B. F. Goodrich Company, Akron, which will require from 300 to 400 tons. Jobbers report warehouse business holding up fairly well. We quote: Iron Bars, 1.45c., Cleveland, for car lots; Steel Bars, 1.50c., Cleveland, for car lots, half extras; Beams and Channels, 1.70c., base, Cleveland, and Plates ¼ in. and heavier 1.70c., Cleveland. We quote Sheets, mill shipments, car lots, Cleveland, as follows: Blue Annealed, No. 10, 1.90c.; Box Annealed, No. 26, 2.60c.; Galvanized, No. 28, 3.65c. Jobbers quote Iron and Steel Bars, out of stock, at 1.65c. to 1.70c. Beams and Channels from warehouse, are 2c., and Plates, ¼ in. and heavier, 1.90c. Warehouse prices on Sheets are as follows: Blue Annealed, No. 10, 2.10c.; Box Annealed, No. 28, 2.70c.; Galvanized, No. 28, 3.80c. Warehouse prices on Boiler Tubes, 2¾ to 5 in., are 64 per cent. discount, and on Black Merchant Iron Pipe, base sizes, 71 per cent. discount.

Old Material.—The market is still very quiet. In spite of the inactivity prices are being firmly held. It is a waiting market on the part of dealers, the majority of whom are unwilling to quote lower prices in order to make sales. The demand shows no improvement, sales being limited to small lots for immediate needs. Dealers do not look for much change in market conditions until after election. The Lake Shore Railroad has a list out this week of about 1000 tons. Dealers' prices to the trade, per gross ton, f.o.b. Cleveland, are as follows:

Old Steel Rails	$14.00 to $14.50
Old Iron Rails	17.00 to 17.50
Steel Car Axles	19.00 to 19.50
Old Car Wheels	15.00 to 15.50
Heavy Melting Steel	13.50 to 14.00
Relaying Rails, 50 lb. and over	22.00 to 23.00
Railroad Malleable	13.25 to 13.75
Agricultural Malleable	12.00 to 12.50
Light Bundled Sheet Scrap	9.50 to 10.00

The following quotations are per net ton, f.o.b. Cleveland:

Iron Car Axles	$20.00 to $20.50
Cast Borings	7.00 to 7.50
Iron and Steel Turnings and Drillings	8.00 to 8.50
Steel Axle Turnings	8.50 to 9.00
No. 1 Busheling	12.00 to 12.50
No. 1 Railroad Wrought	13.50 to 14.00
No. 1 Cast	12.00 to 13.00
Stove Plate	10.75 to 11.25
Bundled Tin Scrap	8.00 to 9.00

Buffalo.

BUFFALO, N. Y., September 29, 1908.

Pig Iron.—A very fair volume of business is now coming in, the bulk of it being for prompt shipment or over the balance of the year. Considerably more Iron is being melted than for the past two or three months. We quote as follows, f.o.b. Buffalo:

No. 1 X Foundry	$16.00 to $16.50
No. 2 X Foundry	15.50 to 16.00
No. 2 Plain	15.00 to 15.50
No. 3 Foundry	14.75 to 15.25
Gray Forge	14.50 to 15.00
Malleable Bessemer	16.00 to 17.00
Charcoal	20.00 to 20.50

Finished Iron and Steel.—Inquiry has fallen off a little as compared with last week. A number of small Structural jobs are in the market and are soon to be closed, but only a moderate amount of new business is being placed. The Smith & Caffrey Company, Syracuse, has closed a contract for the Steel required in the new Unity Building to be erected in that city, amounting to about 500 tons. The material will be fabricated by the Jones & Laughlin Steel Company. Bids were submitted this week for Steel work on the Sinclair-Rooney Building, Washington and Eagle streets, Buffalo, involving only a small tonnage.

Old Material.—The market is dull and inactive, very little business being transacted. The following prices, per gross ton, f.o.b. Buffalo, fairly represent the market:

Heavy Melting Steel Scrap	$14.00 to $14.25
No. 1 Railroad Wrought	15.00 to 15.25
No. 1 Railroad and Machinery Cast Scrap	14.00 to 14.50
Old Steel Axles	17.00 to 17.50
Old Iron Axles	20.00 to 20.50
Old Car Wheels	15.00 to 15.50
Railroad Malleable	13.00 to 13.50
Boiler Plate	12.00 to 12.50
Locomotive Grate Bars	11.50 to 12.00
Pipe	11.50 to 12.00
Wrought Iron and Soft Steel Turnings	8.00 to 8.25
Clean Cast Iron Borings	6.50 to 7.00
No. 1 Busheling Scrap	12.50 to 13.00

Metal Market.

NEW YORK, September 30, 1908.

Pig Tin.—Some improvement in the volume of business and also in price has taken place. It appeared as if buyers were waiting until after the Banca sale to make their purchases. This sale went on an equivalent to 29c., c.i.f. New York, which was considered a fair price. An important announcement relative to the Banca sales next year had some slight influence on the market. That was that each of the six sales would consist of 50 tons more, making a total sale of Banca Tin of about 11,400 tons. Price changes during the week have been as follows:

	Cents.
September 23	28.70 to 28.75
September 24	29.15
September 25	29.40
September 28	29.20
September 29	29.15
September 30	29.62½

The deliveries into consumption during September will be 2300 tons, and as arrivals have been 2367 tons, stocks will increase slightly. The world's visible supply, however, will show a marked gain. The afloats are 1145 tons. A sharp advance in the London market to £132 2s. 6d. for spot and £135 10s. for futures this afternoon was reflected here, where prices advanced ½c. The higher prices in London were partially the result of better business from this side, buying by the leading consumer here, and by the announcement that the Straits shipments for September would be 4155 tons, whereas 4700 tons had been expected.

Copper.—Sellers think the price for Electrolytic is about 13.37½c. to 13.50c., and buyers believe it should be about 13c. Under such circumstances, it is natural that business is at a standstill. The large consumers of Copper, and they are many, either have enough bought for present needs, or are covered by sliding scale contracts. A sale was made on Friday, at 13.25c., and later that day a lot was freely offered at that price. This lot was subsequently withdrawn. Lake Copper is not pressed for sale, and producers continue to ask 14c. Second-hand lots can be had at 13.75c., but even this is high. Domestic consumption, especially in the lighter lines, is fair. The Sheet Copper trade is good, and some branches of the Brass trade leave little to be desired, as far as tonnage is concerned. Competition, though, is keen in all finished and semifinished lines. The expected buying from Europe has not developed yet, but 19,270 tons have been exported this month. The solution of the problem of prices would be a good deal easier if production would only remain stationary, but it keeps on steadily increasing. We are entering the last quarter of the year, with production at the rate of 430,000 tons in the United States alone. The only encouraging thing about the trade is the low price, for it is hoped this will stimulate renewed activity in heavier lines, as it has in Sheets. The London market closes to-day, at £59 17s. 6d. for spot, and £60 3s. 9d. for futures.

Pig Lead.—The market is weaker. Soft Missouri brands can be had at 4.57½c., New York, and 4.32½c., St. Louis. The American Smelting & Refining Company continues to ask 4.60c., New York, and this is also the price of some other producers.

Spelter.—The market is firmer, at 4.65c. to 4.70c., St. Louis, and 4.80c. to 4.85c., New York, for prime Western brands. This is due to the lessened supply, there having been a marked curtailment in production, but the demand is small, as the galvanizing works are not running over 60 per cent. capacity and the Brass mills less than 75 per cent.

Antimony.—Some speculative buying has been going on and prices are said to be slightly higher, at 7.87½c. to 8c. for Cookson's, 7.75c. for Hallett's and 7.50c. for other brands.

Tin Plate.—Business is very dull, and operations at the mills are at a much reduced scale. Prices are steady, and without change, however, at $3.89, New York, and $3.70, Pittsburgh, for 100 lb. IC Coke Plates.

Old Metals.—Little or no business has developed; still, Old Metal dealers are not averse to accumulating Metal, providing that it can be obtained at reasonable prices. At the same time, they are not anxious sellers, and these prices continue unchanged from last week, as follows:

	Cents.
Copper, Heavy and Crucible	12.50 to 12.75
Copper, Heavy and Wire	12.25 to 12.50
Copper, Light and Bottoms	11.50 to 11.75
Brass, Heavy	9.25 to 9.50
Brass, Light	7.25 to 7.50
Heavy Machine Compositions	11.75 to 12.00
Clean Brass Turnings	8.25 to 8.50
Composition Turnings	9.50 to 9.75
Lead, Heavy	4.20 to 4.25
Lead, Tea	3.85 to 3.90
Zinc Scrap	3.25 to 3.50

New York.

NEW YORK, September 30, 1908.

Pig Iron.—One of the large interests reports that a large tonnage has been sold during the past week, including Foundry, Forge and Basic Iron in the territory east of Harrisburg, all for delivery during the current year. Included in these sales are one lot of 10,000 tons of Basic Pig and one lot of 5500 tons. We quote, at tidewater, Northern No. 1 Foundry, $17.25 to $17.75; No. 2 Foundry, $16.75 to $17.25, and No. 2 Plain, $15.75 to $16.25. Alabama Irons are quoted at $17.50 to $17.75 for No. 1 Foundry, and $16.75 to $17.25 for No. 2 Foundry.

Structural Material.—The Ritz-Carlton Hotel project on Madison avenue has assumed larger proportions. It is expected that two buildings will be erected by separate companies, but both will be occupied by the hotel. About 5000 tons of Steel for this enterprise is being figured on this week by the fabricating companies. The Milliken Brothers' receivers have taken two local contracts—the Ardell Apartment House and the Martin Building, on the southeast corner of Thirty-second street and Broadway—a total of 2000 tons of Steel being involved. The other Martin project, the addition to the Martinique Hotel, on the northeast corner of Thirty-second street and Broadway, is in abeyance. More than 20,000 tons of Steel will be needed for local buildings, for which the fabricating contracts are about to be awarded. In the case of the Emigrant Savings Bank, on Chambers street, a contract involving new erection without the previous demolition of the old, figures on revised specifications are still being taken. It is still expected that 5500 tons of Steel will be needed. The railroad bridge work pending, amounting to some 30,000 tons, does not come forward as hoped. Financial considerations cut some figure apparently. In the case of the Carolina, Clinchfield & Ohio work, it is now the intention to put through only about 3000 tons, or one-half the contemplated contracts, this being for the south end of the line. The Pennsylvania Railroad placed the 800 tons for its three-span bridge over the Susquehanna River with the Pennsylvania Steel Company, and the Pennsylvania Lines West have contracted for a 600-ton bridge. The Mt. Vernon Bridge Company, Mt. Vernon, Ohio, has taken a Hocking Valley and a Kanawha & Michigan bridge, about 650 tons together. For the Musical College Building at Chicago the contract was given to the Hansell-Ellcock Company, and 1300 tons of Bethlehem Shapes will be used. At St. Joseph, Mo., a 500-ton warehouse contract has been awarded in the past week. Altogether the September business of the American Bridge Company, including the Oliver contract at Pittsburgh, amounts to about 20,000 tons. Low prices are the rule on every piece of Steel erection that comes up, and it is more and more of a question how long the attitude of leading fabricators, whose prices have generally been nearest the ostensible basis of Structural Steel prices, will be maintained. With shipments of fabricated Steel in excess of orders booked, the time will come at length when new business must be depended on entirely. For shipments of plain material from mill the following quotations are made on tidewater delivery: Beams, Channels, Angles and Zees, 1.76c.; Tees, 1.81c. On Beams, 13 to 24 in., and Angles, over 6 in., the extra is 0.10c. Structural Material, cut to lengths, is sold in small lots at about 2¼c.

Bars.—The current demand for Bar Iron is less in volume than for the past month, which is probably due to political uncertainty. In some lines the consumption of Bars has increased slightly, but the slackened demand in other directions has probably more than counterbalanced it.

Quotations on Bar Iron continue to range from 1.45c. to 1.50c., tidewater, while Steel Bars are unchanged, at 1.56c., tidewater.

Plates.—Although large orders for Sheared Plates have for some time been practically unknown, the daily run of business has recently been increasing in volume, as more orders, ranging from small lots to 50 tons, have been coming in. The demand for Universal Plates is fair. Prices are held as follows at tidewater for standard sized Plates: Sheared Plates, 1.76c. to 1.86c.; Flange Plates, 1.86c. to 1.96c.; Marine Plates, 2.16c. to 2.26c.; Firebox Plates, 2.65c. to 3.50c., according to specifications.

Ferroalloys.—The demand is slow, and prices are unchanged, around $43.50, Baltimore, for Ferromanganese, and $68 to $70, delivered, for 50 per cent. Ferrosilicon.

Cast Iron Pipe.—No lettings of any importance have been announced in addition to those reported last week. The Long Beach Estates, now making improvements at Long Beach on Long Island, are making inquiries for prices on about 3000 tons, ranging from 4 to 10 in., but no date has been fixed for closing a contract. Carload lots are in quite light demand. Quotations are continued at $24 to $24.50, tidewater, for carload lots of 6 in.

Old Material.—The market is dull but firm. Some little demand it noted for Cast Scrap, but seldom for lots running over 100 tons, as foundrymen are buying only from hand to mouth. Borings and Turnings are in somewhat better request than other classes of rolling mill stock. Some buying of No. 1 Railroad Wrought was observed early in the week, but this class of Scrap is now as quiet as other grades. A little Steel Scrap is being sold at ruling prices. Quotations are as follows per gross ton, New York and vicinity:

Old Girder and T Rails for melting	$11.50 to $12.00
Heavy Melting Steel Scrap	11.50 to 12.00
Old Steel Rails, rerolling lengths	14.00 to 14.50
Relaying Rails	22.50 to 23.00
Old Iron Rails	16.50 to 17.00
Standard Hammered Iron Car Axles	18.50 to 19.00
Old Steel Car Axles	15.50 to 16.00
No. 1 Railroad Wrought	15.00 to 16.00
Iron Track Scrap	12.00 to 13.00
No. 1 Yard Wrought, long	14.00 to 14.50
No. 1 Yard Wrought, short	12.50 to 13.50
Light Iron	7.00 to 7.50
Cast Borings	7.50 to 8.00
Wrought Turnings	8.50 to 9.00
Wrought Pipe	11.00 to 11.50
Old Car Wheels	14.50 to 15.00
No. 1 Heavy Cast, broken up	13.50 to 14.00
Stove Plate	11.50 to 12.00
Locomotive Grate Bars	11.50 to 12.00
Malleable Cast	12.50 to 13.00

Iron and Industrial Stocks.

NEW YORK, September 30, 1908.

The course of the stock market has been somewhat irregular, being influenced from day to day by political occurrences. In some instances prices have been adversely affected, but in the main the market has been fairly firm. The range of prices on active iron and steel stocks from Thursday of last week to Tuesday of this week was as follows: United States Steel common 43 to 45⅞, preferred 107⅛ to 109⅝; Bethlehem Steel common 21 to 22; Car & Foundry common 37½ to 40⅛, preferred 102¼; Locomotive common 45¼ to 46⅞, preferred 101 to 101½; Steel Foundries, new, 28 to 29⅞; Cambria Steel 35⅜ to 36¼; Colorado Fuel 32⅛ to 35⅞; Crucible Steel common 6 to 6¼, preferred 43 to 45; Pressed Steel common 30¾ to 31½, preferred 92¾ to 93; Railway Spring common 35 to 38; Republic common 21½ to 22, preferred 77 to 78½; Sloss-Sheffield common 59 to 61; Cast Iron Pipe common 23½ to 25, preferred 71⅜ to 73⅝; Can common 5¼, preferred 57½ to 58. Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 45⅛, preferred 108⅝, bonds 102; Car & Foundry common 38¾, preferred 102¼; Locomotive common 45¾, preferred 101½; Colorado Fuel 34½; Pressed Steel common 31⅜, preferred 92¾; Railway Spring common 38; Republic common 21½, preferred 78; Sloss-Sheffield common 60; Cast Iron Pipe common 23⅝, preferred 72½; Can common 5½, preferred 58.

Dividends.—The Railway Steel Spring Company has declared a semiannual dividend of 1 per cent. on the common stock, payable October 22.

The American Brake Shoe & Foundry Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred and 1 per cent. on the common stock.

The Nicholson File Company has declared a quarterly dividend of 2½ per cent.

The Tuthill Spring Company, Chicago, Ill., has declared an annual dividend of 12 per cent.

The Falls Hollow Staybolt Company, Cuyahoga Falls, Ohio, recently made large shipments of Falls Hollow staybolt iron to the Great Southern of Spain Railroad Company; the Australian Government Railways, Brisbane, Australia; the Payta-Piura Railway, Payta, Peru, and the Western Railway of Havana, Havana, Cuba. A nice order is in hand for a large tonnage of Falls Hollow iron for shipment to the Ferro Carril de Entre Rios of Argentine, also another for the North Brabant German Railway Company, Gennep, Holland. The 10 locomotives recently ordered by the International & Great Northern Railroad from the American Locomotive Company are to be equipped throughout with Falls Hollow bolts, likewise the six locomotives ordered from the Baldwin Locomotive Works by the Iowa Central Railway and one locomotive ordered by the Mexican Central Railway.

New Publications.

The Mineral Industry: Its Statistics, Technology and Trade During 1907. Volume XVI. Edited by Walter Renton Ingalls, editor *Engineering and Mining Journal*. Hill Publishing Company, New York. Price, $10.

It is a huge undertaking for a private interest to attempt to gather, and to collate, the statistics of production of the minerals of the United States, and of foreign countries, to review commercial developments and trace technical progress. To the extent that it involves duplication of statistical works, for which the Government has better facilities and much larger means, it is a waste of effort, but when it deals with a candid review of commercial conditions and an expert study of technical experiment and achievement, a splendid field is opened. We observe that in that direction the editor of the *Mineral Industry* is decidedly gaining ground. The volumes are growing to be a perfect mine of industrial, technical and commercial information, which is not available from any other source, and it is particularly in copper, lead, zinc and the precious metals that accurate and comprehensive data are available. Iron and steel and coal and coke seem to be less ably handled. The general system pursued is to present a statistical and commercial review, followed by data on local development from recognized authorities in each district, and by papers on metallurgical inventions and practice, with often copious reference to the literature at home and abroad. Elaborate papers are also presented on the industry of some particular well-known district. Thus we notice a highly valuable account of the Mount Lysee copper mining and smelting by Robert C. Sticht, an American engineer, who was in charge for years. Progress in ore dressing and coal washing in 1907, in a general review, the joint authors being Robert H. Richards and Charles E. Locke, while Prof. J. F. Kemp of Columbia reviews the literature on ore deposits in 1907. Altogether the work is one of which the American profession of mining engineering may well be proud.

The Berger Mfg. Company, Canton, Ohio, manufacturer of sheets and sheet metal specialties, will enlarge its plant by the erection of 10 hot mills, increasing the number of such mills to 21. Contracts for the equipment have been closed, and it is expected that the additions will be completed by next March. The company has purchased 14 acres of land adjoining its present site to make room for the additions. Five new buildings will be erected. Three of them—140 x 350 ft., 60 x 80 ft., and 40 x 70 ft.—will be of structural steel, and will be built by the Pittsburgh Bridge & Iron Company. Two additional brick buildings will be erected, one 50 x 210 ft. and the other 80 x 250 ft. The enlargement of the plant will make it the second largest sheet rolling mill in the country.

The M. Rumely Company, La Porte, Ind., builder of threshing machinery and engines, has let a contract for and work has begun on a three-story building, 115 x 240 ft., which will be used for manufacturing and storage purposes. The company is also enlarging its foundry capacity. A new line recently developed is the manufacture of plowing engines, in which the building of a motor sufficiently strong and properly proportioned to stand the strains incident to that kind of work is the chief problem. This, it is believed, has been satisfactorily solved in the engine as now designed.

Customs Decisions.

Steel Window Frames.

A decision of considerable importance to the building trade of the United States was handed down last week when it was decided that steel window frames with sashes and gunmetal handles, stays, &c., are dutiable at 45 per cent., as manufactured articles wholly of metal, not specially provided for. E. M. Ackerson, New York, the importer, set up the claim that the merchandise should be admitted as "structural shapes or building forms," and as such dutiable at the rate of five-tenths of one cent per pound. The invoice described the articles as "steel channels of structural shapes and forms punched and fitted together for use."

General Appraiser Fischer, in overruling the importer's protest, does not seem to give much credence to the contention of the importers. After remarking that the invoice describes the articles as steel channels, gunmetal handles, &c., he says that, though invoiced and described in this fashion, the exhibits and the testimony offered show that these articles as imported are complete steel window sashes with steel slides, fitted with gunmetal stays and gunmetal handles or hinges, all fastened together. In conclusion he says: "In fact, it is conceded that these steel window cases have been manufactured, fitted, painted, and advanced to that form to fit their special places in the masonry of the Singer Building. The contention of the importer for a lower rate of duty is overruled."

Wire Rat Traps.

After several years of litigation, the Board of United States General Appraisers decided September 25 that the exaction of an additional duty of two-tenths cent per pound on rat traps made of steel wire coated with copper is illegal. The case just decided was in the name of the Burditt & Williams Company, Boston. The collector had decided that the articles were dutiable properly under paragraph 137 of the tariff act, which, in conjunction with a proviso of the same section of the law, called for a duty of 2 cents per pound, plus 1¼ cents a pound, plus two-tenths cent a pound. The importers alleged that the traps are not subject to the imposition of the additional duty of two-tenths cent per pound. This contention the Board, in a decision by General Appraiser Fischer, upholds. In sustaining the claim of the importer, the decision says:

> With respect to paragraph 137, tariff act of 1897, providing a duty on wire and an additional duty on articles made from wire, with the further provision that coated wire shall pay a duty of two-tenths cent per pound in addition to the rate imposed on the wire from which it is made, it is held that under a usage established in customs practice rat traps made from coated wire are dutiable at 1¼ cents per pound in addition to that imposed on the wire and without the imposition of the additional duty on coated wire as provided for under the concluding clause of the second provision of said paragraph.
>
> The Treasury Department having created a new practice as to the classification of wire coated articles, and by instructions having given timely notice thereof, rat traps made of coated wire would, in view of such modification, be now dutiable at the rates provided by the statute, which includes additional duty for the coating of the wire as well as the additional duty of 1¼ cents per pound imposed on articles made from wire as provided by paragraph 137, and its proviso, tariff act of 1897.

The plant and business of the Worcester Steel Foundry Company, Millbury, Mass., manufacturer of crucible steel castings, have been taken over by the Oakley Steel Foundry Company, of which W. E. Oakley is the general manager. Mr. Oakley was the founder of the business, and several years ago sold out his interests to a new corporation, which discontinued manufacturing some months ago. It was at first proposed to lease the property to another concern, but Mr. Oakley, returning from England where he has passed the last few years, finding the plant shut down decided to buy it and resume his old business. Associated with him in the company is Henry T. Maxwell. Several devices covered by new patents issued to Mr. Oakley will be manufactured at the Millbury Foundry. One is an oil burning furnace for steam boilers, which has been given satisfactory tests in England under both stationary and marine installations. A feature will be made of crucible steel castings for special purposes.

Railroad Equipment Companies to Organize.

A movement which has been under way for some weeks among the railroad equipment companies of the country, including many machinery manufacturers, is expected to result in the formation of an association at a meeting appointed for the Waldorf-Astoria Hotel, New York, Wednesday afternoon, September 30. The preliminaries were conducted by a committee of four presidents of equipment companies, consisting of Otis H. Cutler of the American Brake Shoe & Foundry Company; Charles A. Moore of Manning, Maxwell & Moore, Inc.; J. S. Coffin of the Franklin Railway Supply Company, and George A. Post of the Standard Coupler Company. This committee addressed a letter in August to the leading equipment interests of the country setting forth the seriousness of the conditions confronting the railroads of the country and the prostration of the industries represented by the equipment companies. The formation of an organization was suggested which should advocate and work for fair play to railroads in matters of Federal and State legislation and arouse all who make their living by serving railroads, including the dependent manufacturing interests, to a sense of active loyalty to their common interests. The above committee, of which George A. Post is chairman, has just given out a list of 106 manufacturers of machinery and railroad equipment who have promised to co-operate in the movement and to be represented at the meeting of September 30. Mr. Post explains that the movement is not at all political, but purely a business one. He adds:

> The dealers in railroad equipment and material have no concern with an increase in freight rates further than the hope for the prosperity of the principal purchasers of the goods we manufacture. It must be understood, of course, that as the largest buyers in the world the American railroads must be given first consideration. But as far as the iniquities of high finance are concerned we are sufferers along with the public at large. We are manufacturers, and together with our hundreds of thousands of employees stand on the outside of any political propaganda; we desire to convince the public that the country is basically in good condition and that all that is lacking is confidence. Railroad rates, as such, will not enter into our discussion at all. If there are things radically wrong in the financial management of the American railroads—and undoubtedly legislative and other reforms are needed—the organization to be formed, representing both capital and labor, should have a voice in council.

The New Reeves Babbitt Metal.—The Reeves Pulley Company, Columbus, Ind., manufacturer of pulleys, clutches and other power transmission appliances, has brought out a new Babbitt metal, which has been christened the Reeves bearing metal. The product is adapted to general machine and factory use. Exclusiveness will be a feature of the sales campaign to be launched soon, but one jobber in each jobbing center being given the sale of the metal. It will be put up in bars of convenient size, packed in boxes of 50-lb. capacity, and is to be sold at 25 cents per pound.

The Westinghouse Air Brake Company, Wilmerding, Pa., has published its report of operations in the fiscal year ending July 31, 1908. The aggregate sales amounted to $5,308,015.56, as compared with $11,230,409.65 for the previous year. The net earnings, which were reduced in about the same proportion, were $2,014,756,57. Cash dividends were paid amounting to $1,787,110, and a stock dividend of 25 per cent. amounting to $2,750,000 was paid January 31. After an allowance for depreciation, a balance was left from the year's earnings of $183,686.47. The Board of Directors has set aside the sum of $110,000 for the establishment of a pension fund, the interest on which, together with an annual appropriation, will be sufficient to meet the requirements of the plan. The surplus July 31, 1908, was $4,911,673.96. The abundant cash resources of the company have enabled it to take advantage of the low prices now prevailing by heavy purchases made in anticipation of an early renewal of activity. The factory stores have thus been increased from $2,533,473.72 last year to $3,148,617.94 this year. The annual meeting occurs October 6.

The Machinery Trade.

NEW YORK, September 30, 1908.

Business with machinery houses continues dull and as yet there are no signs of an early arrival of the fall activity expected months ago. A few houses report a fair business the past week or two, but they are exceptions, the large majority reporting a falling off since the first week in September. With many houses July was the best month since February, and since then the demand has been much lighter, though the increase in July led many to believe that the upward trend had started and that the fall would see a resumption of activity, especially among the railroads and large industrial corporations. These interests are still inactive and the general opinion prevails that they will do nothing of importance until after the election. In speaking of the features of the trade a prominent machine tool builder stated that orders and inquiries of importance were few, but there was a great deal of talk of an improvement in business, which has not yet reached his company. The spurt in trade during the early summer was due to a great extent to the large demand for machine tools by the automobile builders throughout the country, and when their wants were filled the demand again fell off. Throughout the depression the purchasing by the automobile manufacturers has been one of the chief mainstays of the trade. While several important motor car builders, especially in Michigan, are preparing to make heavy purchases of machine tools in the near future, the demand from that source for the last few weeks has been very light. The marked falling off in the demand for machine tools since the automobile companies ceased buying shows how little business has been secured from the railroads and industrial plants. It is stated that during the depression in 1895 the machinery trade was held up by the purchases of the bicycle makers. In speaking of these two developments which have so materially aided machine tool builders in off years, several machinery men speculated as to what would be the next that would cause a large demand for mechanical equipment. One thought that a further expansion of the automobile builders in the way of new shops for the building of commercial cars would be the next development that would stimulate trade, while another was of the opinion that the electrification of the railroads for suburban travel would be the next greatest factor in the machinery market. Some of the railroads have already undertaken the latter work, and from current reports others contemplate doing so in the near future. A discussion of this important work was recently taken up and an estimate made that it will take over $2,000,000,000 to accomplish it. Naturally the work would be extended over many years, but increase in travel demands the more modern method and it is bound to come. The expenditure of so large a sum of money would be of great importance to machinery manufacturers.

The increase in the building of automobiles has necessitated the purchase of a large number of machine tools, and especially has the sales by machinery houses to automobile builders been conspicuous in the spring and summer when the demand from other sources was rather light. The automobile manufacturers are preparing for a great output next year, and at least two companies will purchase a good sized equipment of tools by the first of the year. We understand that the Everitt-Metzger-Flanders Company, Detroit, Mich., is preparing to build 12,000 machines next year, to produce which it will practically duplicate its present plant. Within the next few days the company will begin the construction of another factory building, 60 x 450 ft., three stories high. The erection of this building will necessitate the purchase of considerable additional machinery, a list of which has not yet been prepared. The company has already installed about $125,000 worth of machine tools, many of which were specially designed for the economical and rapid production of automobiles in large quantities. In connection with this, it will be of interest to note that another large Detroit automobile builder is to erect a new plant and for its equipment will probably purchase a great deal of new machinery. The builder referred to is the Ford Motor Company, which has purchased a tract of 60 acres, on which it will erect a four-story reinforced concrete building, 75 x 865 ft., the equipment to include machinery for making every part that enters into the construction of an automobile, from screws to upholstery. About the time this building is completed, which will be about January 1, the company will be in a position to decide upon the amount and character of new machinery it will have to buy for its equipment.

There are inquiries in the market from a Russian concern for equipment in the way of presses, machine tools, &c., for a saw factory.

Thornton N. Motley of Thornton N. Motley & Co. has been appointed purchasing agent for the Cienfuegos water works enterprise at Cienfuegos, Cuba, the concession for which was recently acquired by Hugh J. Reilly and for which Donovan & Phillips of Boston are the engineers. The enterprise will entail an expenditure of more than $1,000,000 and will include the purchase of about 20,000 tons of cast iron pipe, of which 14,000 tons has been bought; about 300 tons of steel steam shovels and other general contractors' equipment, and perhaps cement working machinery. The buying will be done from the office of Thornton N. Motley & Co., 30 Church street, New York.

The American Cement Engineering Company, 315 Fifth avenue, New York, has entered into contracts under the terms of which it will construct for the Knickerbocker Portland Cement Company two cement plants on the Hudson River, with a combined daily capacity of 12,000 bbl. and an annual output of not less than 4,000,000 bbl. of Portland cement. Work will start almost immediately on the rebuilding of the 2000-bbl. plant at Hudson, N. Y., its capacity to be raised to 6000 bbl., the engineering company promising to have the plant in condition to reach a production at the rate of 2,000,000 bbl. annually by the latter part of next spring. Work on this plant will be pushed rapidly to completion. The construction of the plant on the other side of the Hudson River, near Catskill, will be started early next year, and the plant will be completed and in operation about a year from the date the foundations are started. Both contracts provide for machinery of the highest efficiency and factory construction generally of the most solid type. From an electrical standpoint these plants will mark the advances made in recent years. The Knickerbocker Portland Cement Company has acquired about 1400 acres of high grade limestone, shale and clay lands on the east bank of the river and more than 500 acres of equally valuable land on the west bank, with ample railway and water shipping facilities on both properties.

The Henry S. Spackman Engineering Company, Philadelphia, Pa., has been retained by the San Antonio Portland Cement Company, San Antonio, Texas, to build a 1000-bbl. cement plant. The plans for the plant are in a preliminary stage, and the amount and character of machinery that will be required has not been determined. The building will be of steel, covered with corrugated iron, and will contain about 40,000 sq. ft. of floor space. It will be erected upon a site of 30 acres, and transportation facilities will be furnished by the International & Great Northern Railroad. C. Baumburger is president of the San Antonio Portland Cement Company and F. W. Cook vice-president.

A contract has been awarded to John R. Lee, Paterson, N. J., for the construction of a trolley line between Suffern, N. Y., and Paterson, N. J., to be built for the North Jersey Traction Railroad. The line will be 15 miles long, and it is intended to be the nucleus of a high speed electric line which it is understood will eventually connect with the Hudson Companies' tunnel at Hoboken. William Barbour of Paterson and Malcolm R. McAdoo of Montclair, N. J., are respectively president and vice-president of the North Jersey Traction railroad, and they, it is understood, are closely associated with the Hudson Companies' interests. The railroad company, however, is an entirely separate venture and it is understood that it has been satisfactorily financed. It is estimated that the line will cost $500,000 and will entail the purchase of a large amount of equipment, both for constructing the line and its operation afterward.

The Bartel Sugar Company, 141 Broadway, New York, which was organized with a Maine charter some time ago, has awarded a contract to the George L. Squires Mfg. Company, Buffalo, N. Y., for equipping a complete sugar plant at Bartel, Cuba, in the Oriente Province, on the Cuba Railway. The structural steel contract for the buildings has been let to the United States Steel Products Company, and all the mechanical equipment will be furnished by the George L. Squires Mfg. Company, which will probably sublet the contract for some of the machinery. The plant will have a capacity of about 5000 tons and will be so arranged that it can be duplicated when necessity arises. It will have a nine-roller mill and crusher, four horizontal return tubular boilers of 250 hp. each, an electric lighting plant, two vacuum pumps, filter presses, crystalizers, centrifugals, sand filters, tanks, pumps, &c. The officers of the company are: C. J. Field, president and general manager; W. P. Bull, vice-president; W. G. A. Hemming, secretary and treasurer, and R. J. Hawes, superintendent and engineer.

The Department of Water Supply, Gas and Electricity of the Borough of Brooklyn will open bids on October 7 for furnishing three complete pumping plants at Smith's Pond, Clear Stream and Valley Stream, L. I. The equipment for each plant will include a marine dry back boiler of about 125 hp., one direct acting horizontal triple expansion pumping engine of 4,000,000 gal. capacity, and the necessary fittings.

Business Changes.

The Spooner-Mathewson Company, New York, has been organized by Henry W. Spooner, Ernest T. Mathewson and Peter G. Rimmer and will succeed to the business of McClave, Rimmer & Co., occupying the offices of the latter firm at 90 West street. The company will act as New York agent for the Ridgway Dynamo & Engine Company, Ridgway, Pa., and in addition to the sale of power plant equipment will sell special machinery and act as consulting engineer. Ernest T. Mathewson was formerly sales manager

of the Standard Machinery Company, Providence, R. I., and later New York representative of the Waterbury Farrel Foundry & Machine Company.

Chicago Machinery Market.

CHICAGO, ILL., September 29, 1908.

Whether the sum total of machinery sales was greater or less in the past week than in the one immediately preceding would on account of the uneven distribution of orders and the moderate fluctuations in volume be difficult to determine. The question of chief importance, however, centers not so closely in the weekly fluctuation of trade volumes as in what may be expected in the way of definite and lasting improvement in the near or more or less distant future. It may be taken for granted that nothing approaching normal activity, or even a promising start to that end, will be realized in machinery lines until after there is well developed betterment in general business conditions. If, therefore, there is in the meantime no backward slippage, and trade continues to maintain its present level, there will be no great disappointment among those who are at all observant of the trend of affairs. Commercial activities are, however, mercurial in their movements, and rarely maintain a stable equilibrium at any given point, so that if not advancing they are likely to be going the other way. Some reassurance is had in the fact that, though the forward momentum is weak and halting, it is, according to all reports, strong enough at present to hold the market from drifting. An analysis of the orders being entered by machine tool dealers shows that there is not so much to complain of in their scarcity as there is in the modest sales footings they represent. In other words, buying is largely restricted to purchases of tools of small value which come singly more often than in groups. The proportion of inquiries for second-hand tools is relatively large, and stocks on warehouse floors are being moved faster than they are being replenished; this, however, should not be interpreted to mean that the actual demand is notably active, since it is due rather to the diminished supply of second-hand tools. Dealers say that very little desirable stock of this kind is being offered. No lots of considerable size have been thrown on the market through forced sales resulting from failures for some time, and the available supply is practically limited to tools displaced by new ones. Much the same conditions as observed in machine tools prevail in motive power equipment. Aside from some large installations of steam and gas engines purchased by rolling mills and other important industrial plants, the demand is principally for small units. The advantage, in point of profit to manufacturers of such equipment, has, unfortunately, not been commensurate with the amount of business secured. Though larger in volume than that of the heavier lines, it was not great enough to go 'round, and was necessarily distributed among a greater number of shops; the consequent sharpness of competition naturally operated to reduce prices to an unsatisfactory level.

Reports from St. Louis indicate that there has been a moderate improvement in the demand for metal working machinery. The demand, however, has been somewhat irregular, but during the past week inquiry has been more general. Manufacturers of special machinery are meeting with a better demand than was the case during the summer.

Expressions from Western manufacturers of tools and machinery, brought out by inquiries as to the present state of the trade, and the future outlook, confirm the general reports of moderate improvement. A hopeful tenor respecting future developments is apparent on all hands, but there is a uniform agreement in the opinion that the way back to normal conditions will be one of slow but gradual rise, as witness the following reports:

The Rockford Drilling Machine Company, Rockford, Ill., says, "Enough business has come in within the last three weeks to warrant putting the shop back on full time, with the present reduced working force, which is equivalent to about 55 per cent. of full capacity. Orders in hand which are principally from the domestic market are sufficient to run at this rate for six weeks. There is, as yet, very little increase in the export demand, but there seems to be a steady upward tendency in domestic buying. Purchases are for immediate shipment, and are evidently made to meet replacements in shop equipment. Inquiries are numerous, and collections have improved considerably."

The Ransom Mfg. Company, Oshkosh, Wis., maker of grinding and polishing machinery, states that the business of last month was the largest since the slump last fall. While the shop is not running at full capacity, more business has been booked than was really expected. Collections are good, and the inquiries indicate the continuance of a fairly good business, notwithstanding the adverse influences of election time.

Walcott & Wood Machine Tool Company, Jackson, Mich., advises that business has increased very materially during the last few weeks; its shops are working full time, and some more men have been taken on. The prospect is regarded as very encouraging for the rest of the year, as well as for the coming year. Foundations have been completed for a new factory building, 70 x 153 ft., one story, with monitor running the entire length. The center bay will have a traveling crane of 25 ft. span, the side bays being used for machinery.

The Stephens-Adamson Mfg. Company, Aurora, Ill., informs us that inquiries and orders for conveying and transmission machinery show a decided improvement. For the past three months the plant has been running about two-thirds capacity 10 hours per day, and the outlook for a slow, but steady, increase of orders is regarded as favorable. Improved facilities recently provided include the installation of a new air compressor and an equipment for using and storing fuel oil for running the forges and furnaces in the steel shop.

The Nortmann-Duffke Foundry Company, Milwaukee, Wis., has just completed a one-story fireproof pattern storage vault, 30 x 50 ft., with roof and sides of reinforced concrete. It has also under construction a brick office building of the same dimensions, and has let a contract for and will soon install a 200-ton hydraulic press for service in its pressed steel department. The pump required to drive this press has not yet been purchased, and bids are being taken on this part of the equipment. As indicating the condition of trade, it is stated that the pressed steel works are running day and night, with full crew, and the foundry department making crucible steel and gray iron castings is occupied to the extent of about 60 per cent. of the business done a year ago.

Taking advantage of the lull in business, the Sibley Machine Tool Company, South Bend, Ind., maker of the Sibley & Ware power drills, is now erecting a new foundry building about 80 x 120 ft., which will include grinding and mill rooms. The new addition will be equipped with up to date machinery, all of which has been contracted for. This improvement, it is stated, is being undertaken because of the belief that the winter season will be a fairly busy one.

Among recent shipments of grinding tools, made by Charles H. Besly & Co., Chicago, are consignments for export to Italy, Australia, Sweden, and Russia, besides which an increasing domestic business is noted. The company has some new styles of disk grinders now in process of construction which, it is claimed, will combine new features that are expected to largely increase the field of disk grinding.

Sustained activity in automobile business contrasts favorably with that in other machinery lines. Among the concerns whose present quarters have proved inadequate to take care of the increased volume of business is the Davis Mfg. Company, Milwaukee, which is now preparing to build a new and more commodious factory. Having purchased a site at Fifteenth avenue and Park street, it will proceed at once to erect a brick building, 100 x 150 ft., with saw tooth roof and concrete floor. The maximum capacity of the present shop is 200 motors a month, while in the new shop this will be increased to 500 motors. The engines built by this company are of the two cylinder type, and are used principally in light runabouts; but as the demand tends toward engines of greater power, a 4 x 4 in. four-cylinder opposed motor engine has been designed. It will develop more power than the 4 x 5 in. two-cylinder machine, and will occupy practically the same space. It is expected that the new shop will be completed within 90 days.

A new granite and marble manufacturing plant is being erected by the Stotzer Granite and Marble Works, Portage, Wis. The dimensions of the new building are 52 x 162 ft., and when completed there will be installed therein a complete equipment of polishing wheels, surfacing machines and derricks.

Bids have been received, and are now being considered by the Southern Colorado Power & Railway Company, Trinidad, Colo., for power equipment, which includes boilers of 1000 aggregate hp., and 1500 kw. turbo-generators, and the construction of 80 miles of transmission lines.

The Milwaukee Board of Public Works will open bids on October 2 for a new 12,000,000 gallon pump, to be installed at the North Point pumping station. The contract will call for the completion of the pump within 15 months from the date of the contract.

Cleveland Machinery Market.

CLEVELAND, OHIO, September 29, 1908.

Some improvement has appeared in the local machine tool market, dealers without exception reporting a larger number of sales and more inquiries. The buying is pretty well scattered among various kinds of industrial concerns and the demand is mostly for medium sized tools, probably more lathes being sold than other kinds of tools. During the summer a majority of the sales were small single tools, but at present a large percentage of the inquiries are for from two to four tools, and as a rule larger tools are being bought. While until recently small shops were the principal buyers, the present demand comes from some of the larger manufacturing establishments, that are either adding to their

equipment or improving their plants by substituting new tools for old ones. The placing of the latter on the market has made the supply of second-hand tools somewhat more plentiful.

Although no large inquiries are coming in there is an improvement in the number, and an inquiry is more certain to result in the placing of an order than it was a few weeks ago. During the summer many inquiries came from concerns that had no intention of buying at the time, but were looking around to see what they would want when they got ready to buy. While there are still plenty of that kind of inquiries, the percentage of inquiries from concerns that are ready to buy is on the increase. Taken altogether, dealers regard the outlook as more encouraging, although they do not look for much further improvement until after election.

There is a little more activity in second-hand tools, and those that are being placed on the market are moving freely.

Machine tool builders report that while the change is very slow, conditions continue to improve slightly from week to week. Railroads are doing a little better, some orders for single tools coming from that source. Makers of pneumatic tools report an improvement in the demand for drills from copper mining companies, but very few sales to structural concerns, that branch of their business showing no improvement. Business has improved with makers of twist drills and reamers. Some large orders for these lines have recently been placed by jobbers. Makers of malleable castings report considerable improvement in orders. The general manufacturing situation continues to grow better. While in some industries the improvement is very slow, in others business has picked up to such an extent that plants are being run at about their normal capacity.

The National Malleable Castings Company will enlarge and improve its Cleveland plant by the erection of a new building to be used as an annealing room. The building will be 132 x 556 ft., one story. An old portion of the present plant is now being torn down to make a site for the new building, on which work will be started soon. A section of the building 300 ft. long will be erected at the present time, and after that is occupied the remaining section will be built. The company reports a very satisfactory improvement in orders and the plant is now running at over half its full capacity, as compared with less than one-fourth capacity during the hight of the depression.

William H. Mortimer, a well-known machinery dealer in this territory, has returned from a four months' tour through Europe and has taken as an associate in business John S. Alcorn, who was formerly connected with an Eastern engine concern. They are located at 423 Schofield Building, under the firm name of Mortimer & Alcorn. They will handle a complete line of tools made by the Becker Milling Machine Company, as well as the products of several other machine tool builders.

The Wright Wrench Company, which is moving from Philadelphia to Akron, Ohio, has installed the machinery in its new plant and expects to have the plant in operation by November 1. The plant will have a capacity of 1000 wrenches per day. The officers of the company are Allen C. Mason, president; F. M. Harshberger, secretary and treasurer, and J. F. Wright, vice-president and general manager.

The Erie Forge Company, Erie, Pa., will add to its present equipment and placed an order with a local dealer during the week for two electric cranes and six machine tools.

The Akron Iron & Wire Company, Akron, Ohio, which was incorporated recently, is located at 80 South street, in that city, where a plant has been operated as a partnership for the past six months. The officers of the company will be as follows: President, J. M. Davidson; manager, J. W. Mueller; secretary and treasurer, F. W. Koerschner.

The Warren Construction Company, Warren, Ohio, has been reorganized and new officers have been elected, as follows: R. I. Gillmer, president; C. E. Osborne, treasurer and general manager; E. Osborne, vice-president and secretary.

The Lucas Machine Tool Company, Cleveland, maker of horizontal boring, milling and drilling machines, reports a slow but steady improvement in orders, nearly all of which are for single tools.

The W. H. Mullins Company, sheet metal worker, Salem, Ohio, received an order a few days ago for 70 rowboats to be shipped to India. This company expects to put out some new power boats next season, in addition to its regular line of speed boats.

The Diebold Safe & Lock Company, Canton, Ohio, expects to build an addition to its plant 160 x 300 ft.

The Ferry Cap & Set Screw Company reports that its plant is being operated overtime to keep up on orders. This company has recently received some large orders from implement makers.

The Silver Mfg. Company, Salem, Ohio, maker of power drills, feed cutters, &c., reports that it is busier than at this time a year ago and that its plant is being run at full capacity, with a large number of orders on its books.

The plant of the Canton Drop Forging & Mfg. Company, Canton, Ohio, is now being run at full capacity, and the company reports a large number of orders on hand.

Cincinnati Machinery Market.

CINCINNATI, OHIO, September 29, 1908.

Those whose business is with or among the tool builders, whose success or failure is in a great measure dependent upon the trade in iron and woodworking tools, are just now preparing for an expected busy season, and this paragraph tells in a nutshell how the business horizon looks hereabouts. The jobbing foundryman keeps in as close or closer touch with the tool manufacturers than almost anybody else. Those foundrymen who make the castings used in the manufacture of machine tools have kept close watch on conditions during the past months of depression and know that all stocks of tools are low, that all surplus stocks have been drawn upon to furnish such castings as were necessary to fill the few orders that have come in, and that if any kind of business revival comes at all the tool builder will have to have castings and have them in double quick time. As it requires from 60 to 90 days to assemble and put together ready for shipment the various parts of a modern tool, such as planers, milling machines, shapers and lathes, one can easily foresee the situation in manufacturing circles if the expected is to happen in the coming election. Some of the larger jobbing foundries in this section are preparing for this period, and have purchased large stocks of iron and have been cleaning up and putting in new tools and paraphernalia. A number of tool manufacturers have of late been quietly assembling parts and making up machines for stock, and these will undoubtedly prove a strong factor in the early stages of the revival which the great majority of manufacturers in this district feel is but a few weeks off. A few of the local establishments are running on full time—55 hr.—and these include makers of engineering specialties, electrical tools, small and medium size electrical power units, drills and drill presses and some miscellaneous tools.

Local toolmakers were practically all bidders on the first list of tools required by the municipality of Cincinnati for installation in the several pumping stations, the filter plant and intake pier of the new water works, and these bids, 22 in number, were opened on September 25. After revision by the board in conjunction with Chief Engineer Benzenberg Tuesday, the awards will be made. The estimates on the list of 18 machines enumerated aggregated $13,000: One 36 in. by 16 ft. engine lathe at main station, one 18 in. by 12 ft. engine lathe at river station, one 16 in. by 12 ft. engine lathe at main station, one 14 in. by 8 ft. engine lathe at Western Hills station, one 30 x 30 in. by 8 ft. metal planer at main station, two 16-in. shapers, one at main station, other at river station; two 48-in. radial drills, one at main station, other at river station; three 20-in. upright drills, main station, Western Hills station and intake pier; one 18-in. upright drill at filtration plant, three 20 x 2½ in. wet tool grinders at main station, river station and Western Hills station; two emery wheel floor stands at main station and intake pier, one emery wheel floor stand at filtration plant. Cincinnati and Hamilton bidders will take all this business, it is thought, not only because of local pride, but from the fact that all tools required are built in shops which make specialties of most of them.

The Cincinnati section of Associated Foundry Foremen held a very interesting meeting on Saturday evening, September 26, at the Palace Hotel. J. B. Orbison, general manager of the Ohio Brass & Mfg. Company of Columbus, Ohio, who was to have delivered an address on "Relation of Labor to Capital," was unable to be present, but his exceedingly clever paper was read by Fred J. Brunner of the Obermayer Company. Foundry foremen could find much of profit and value in Mr. Orbison's words. The adoption of the new constitution and by-laws will probably be a feature of the October meeting. President John A. Logan of the association came down from Dayton, where he is at the head of the foundry of the National Cash Register Company. E. C. Breuning, a member from Springfield, Ohio, E. W. Ross Company, was another visitor to the city.

Boiler and engine manufacturers are feeling somewhat encouraged over recent inquiries, and the letting of a number of municipal lighting and power plants have stimulated local trade conditions in these lines considerably. In this connection the announcement of the Michigan Wagon & Mfg. Company of St. Johns, Mich., is interesting. This company expects to equip its entire boiler room with water tube boilers, according to information received by a large local iron and steel concern.

A verification of newspaper articles speaking of the activity at the plant of the American Steel & Iron Company, Norwalk, Ohio, is received from General Manager H. E. Frazier, who says: "Our business is improving very rapidly and we are making arrangements now to put on three shifts. We have been working double turn for some time past, and with the present prospects are satisfied that we will be able to continue working on the three-shift basis for months to come." The adjustment of the affairs of the Norwalk Iron & Steel Company and the Wm. Kavanaugh Company is now

about completed, and it is announced that within the next 30 days all matters in connection with the two old companies will be closed up and the American Steel & Iron Company will be in full control of the entire property.

Secretary and Treasurer A. W. Monroe of the Galion (Ohio) Metallic Vault Company verifies printed reports of the recent purchase by that company of the old gear works property, a building 50 x 620 ft., two stories, in which will be located new machinery and other working apparatus incidental to its business. He adds that the company has added a new air compressor, a hydraulic press, &c. It is possible his company may engage in the manufacture of some of the materials to be used in the general jobbing business of undertakers' supplies.

The Beeler Mfg. Company, Alexandria, Ind., has just installed in the building formerly occupied as the Madison Hotel two carloads of machinery shipped from Fowler, Ind., and will start up in a short time.

Philadelphia Machinery Market.

PHILADELPHIA, PA., September 29, 1908.

Business keeps moving slowly in an irregular fashion, and while some dealers report a shade more demand, the increase is not sufficient to have any bearing on the situation. While it is too early to learn what the volume of business transacted in the different branches of the machinery trade during the month of September has been, there is no doubt, judging from the weekly reports of manufacturers and merchants, that both betterments and declines will be shown, and that the average will show just about that for the previous month. In the special tool line an increase will probably be shown, but the business done in some classes of standard machine tools will fall behind.

There has been some disappointment in the trade owing to the lack of developments on the part of the railroads. It was believed, from indications apparent during August, that some railroad buying would come out in September, and while some purchases in the way of rolling stock and increased activity in railroad repair and construction shops developed, very little indeed came out of interest to the machine tool trade. That the outlook for the future is improved by this action of the railraods is without question, as it indicates a movement in the right direction, but it seems as if purchases of machine tools by the railroads, at least in any volume, were still a matter of the future.

Inquiries recently show some slight improvement, not that they have increased materially in volume, but the demand for tools of the heavier and better classes shows some betterment. About an even volume of day to day business in the smaller tools is to be noted, and it is this class which makes up the bulk of the buying. The amount of business pending is quite large, but it is next to impossible to get buyers to place orders for equipment other than that urgently needed. The Presidential campaign is undoubtedly holding back a large volume of business, and many buyers who under ordinary circumstances would not delay their purchases are waiting to see the outcome of the November elections.

Manufacturers, as a rule, show but little increase in production. Some of the smaller plants show a betterment in this direction, but the larger manufacturers show practically no improvement. Special tool makers have taken on a somewhat better volume of orders, but the actual gain in output has been small.

There has been a little improvement in the export business. Some manufacturers have booked orders from the Isthmian Canal Commission, but the business transacted for shipment to Europe and other foreign countries continues extremely light. Manufacturers of specialties for power transmission purposes, in which quite a large volume of business has been done heretofore, report orders small in number and size.

Business in second-hand machinery continues fair. Sales have not been large, but a fairly even day to day business has been transacted. Trade has been closely confined to small tool propositions. The demand for second-hand boilers, engines, pumps, &c., appears to be somewhat more active and a shade more business has been done in equipment of the medium powers.

There is a somewhat improved demand for both steel and gray iron castings, but only a small share of the business comes from machine tool builders. Railroad purchases are also rather meager, although an improvement is to be noted on the part of the users of general castings, as well as work of a municipal character.

The Wm. Steele & Sons Company, contracting engineer, has plans posted for a new furniture manufacturing plant to be erected for the Lincoln Furniture Company, at Lehigh avenue and Margie street. Plans provide for a five and two story structure of brick and concrete, covering an area of 70 x 398 ft. The factory is to be fireproof and modern in every respect.

The Hess Machine Works reports business rather quiet. The demand for file making machinery for export continues fair, but domestic business is inactive. There is a moderate demand for special machinery, but the plant continues to be operated with reduced working forces. Shipments of file making machinery for export recently include four sets of machines for shipment to customers in both Germany and Japan.

The Girard Estate has let the contract for a new central power station, plans for which were made by John T. Windrim, architect and engineer, to be located at Twentieth street and Oregon avenue, mention of which has been previously made. The building, which is 32 x 88 ft., will be erected by H. E. Haven, contractor, while the power equipment was awarded to J. F. Buchanan & Co., of this city.

The Baldwin Locomotive Works notes no material betterment in the demand, although the outlook for business in the near future is decidedly more favorable. Orders are usually small, those for single engines predominating. The recent report that this company had received orders for a considerable number of engines for shipment to Brazil is denied. There has been no change recently in the operating forces of the plant, the employees numbering about 4500, working 5 hr. per day.

The Riverside Engine Company, Oil City, Pa., has extended its sales organization by the opening of a Philadelphia office at 49 North Seventh street in charge of W. T. Dallett.

New England Machinery Market.

WORCESTER, MASS., September 29, 1908.

Some lines of metal manufacturing are showing decided improvement in the form of increasing orders, notable among them being hardware and wire, the production of which has increased sharply during the past month. The machine tool manufacturers are not sharing to any great extent in these more prosperous conditions. Business is a little better with most of them, especially where tools are used for direct manufacturing as distinguished from machinery building. Foreign orders are more numerous, if anything, though Europe is not doing much buying. In a few exceptional instances improvement is more pronounced. Among such is that of the Pratt & Whitney Company, Hartford, which in August did 25 per cent. more business than in any previous month of the year, and in September is making a total of 50 per cent. increase, doubling the gain of August. Foreign business is better with this company, but these orders are chiefly confined to gun machinery. In fact, a large part of all orders received are for the more special of the Pratt & Whitney tools. The Taylor & Fenn Company, Hartford, has just booked a German order for 17 spindles of sensitive drills. The New England railroads report a very great increase in demand for freight cars, comparatively few being idle, and state that manufactured products constitute a large share of the volume of shipments.

Arrangements for reorganizing the Pope Mfg. Company, Hartford, Conn., are completed, excepting the final action of the courts. The new stock has been underwritten, and everything else is in readiness to establish the business on its new basis. The Hartford and Westfield plants, which alone of the company's properties remain, are both beginning on a busy schedule of operation.

The Billings & Spencer Company, Hartford, Conn., is bringing out an improved trimmer miller for use in making trimmer and blanking dies, and an improved hot and cold saw. The former is an entirely new type of tool, containing important features of usefulness.

The Union Metal Works, Carter and Beach streets, Chelsea, Mass., manufacturer of copper and brass work, the plant of which was destroyed recently, will rebuild immediately, the purpose being to have the new building ready for occupancy by November 15. The foundry and machine shop will have a floor space of 15,000 sq. ft. The company states that it is in the market for brass working machinery and other machine shop equipment.

The Waterbury Clock Company, Waterbury, Conn., is planning to erect still another factory building, to be an addition to that just completed, which has been mentioned in this column. The plans call for a structure 40 x 175 ft. and five stories. No decision has been reached as to when the work of construction will begin, this depending somewhat on the state of the weather and other conditions.

The A. H. Nilson Machine Company, Bridgeport, Conn., manufacturer of automatic machinery, has let the contract for an extension of its plant, which will be 75 x 77 ft. and one story, of terra cotta and steel. The company states that it will not be in the market for equipment at present, the purpose being to provide new space which will be utilized when business resumes its normal proportions.

The Franklin Moore Company, Winsted, Conn., manufacturer of chain hoists, carriage bolts, &c., has decided to discontinue the foundry which it has been operating for the past three years, and has sold this department of its business to the Sessions Foundry Company, Bristol, Conn., manufacturer of iron castings. The equipment has been moved to Bristol. The Franklin Moore Company has been doing

a jobbing business as well as manufacturing its own castings, and some large customers have been turned over to the Sessions Company.

The Connecticut Iron, Steel & Metals Company, Bridgeport, Conn., has been organized under Connecticut laws with a capital stock of $30,000, to specialize in the manufacture of sash weights for the trade in New York and New England. George I. Stanford, Milford, Conn., is the president; Robert H. Gould, Bridgeport, vice-president, and Ernest Towle Van Zandt, New York, secretary and treasurer. The plant will be located at Bridgeport, and will be in operation about December 1, the company states. The plans call for manufacturing on a large scale, with a capacity of 200 tons weekly, the business being concentrated upon sash weights. The New York office is at 35 Nassau street, and that at Bridgeport in the Security Building.

The Ready Tool Company, New Haven, Conn., is a new Connecticut corporation with capital stock of $10,000, or ganized to manufacture tools and machinery. George A. Barnes is the president; John R. Jarvis, secretary, and Harold Fish, treasurer. The company is not ready to make detailed announcement of its plans.

A. S. Ingraham, Attleboro, Mass., electro plater, is building a five-story factory at a cost of $20,000. Power will be supplied from oil engine generator sets and electric motors.

The Peck & Way Mfg. Company, Forestville, Conn., has been incorporated in Connecticut with an authorized capital of $10,000, to manufacture small springs and bent wire specialties, and has established a factory in that suburb of Bristol, a suitable building for the purpose having been leased. Charles W. Peck is president and Alvah B. Way secretary and treasurer. Mr. Way has been for eight years sales manager of the Wallace Barnes Company, Bristol, spring manufacturer, and Mr. Peck has been with the same company for some time. The company has installed some machinery, and will add more from time to time.

The Hart & Cooley Company, New Britain, Conn., manufacturer of steel registers and steel lockers, is to build a three-story addition to its works, 50 x 50 ft., for which no new equipment will be required.

W. H. Batcheller, Bridgeport, Conn., has begun the erection of a manufacturing building on Railroad avenue, for which some general equipment will be required.

Government Purchases.

WASHINGTON, D. C., September 29, 1908.

The Isthmian Canal Commission will receive bids until October 22, Circular No. 471, for locomotive crane, pumps, flue welder, arbor presses, shop tools and other supplies.

The following bids were opened September 22 for machinery for the navy yards:

Class 1.—One double punch and shear—Bidder 32, Cleveland Punch & Shear Works, Cleveland, Ohio, $5300; 90, Henshaw, Bulkley & Co., San Francisco, Cal., $6150 and $6100; 91, Harron, Ricard & McCone, San Francisco, Cal., $6570; 113, Long & Alstatter Company, Hamilton, Ohio, $4700; 176, Scully Steel & Iron Company, Chicago, Ill., $6180; 196, Toledo Machine & Tool Company, Toledo, Ohio, $5995; 213, Wickes Brothers, Saginaw, Mich., $5818.56 and $5674.41.

Class 91.—One multiple drilling machine—Bidder 33, Chandler & Farquhar Company, Boston, Mass., $715; 153, Prentiss Tool & Supply Company, New York, $687; 197, Tucker Tool & Machine Company, New York, $1600; 209, Vermilye & Power, New York, $1560.

Class 92.—One multiple drilling machine—Bidder 33, Chandler & Farquhar Company, Boston, Mass., $431; 86, Hill, Clarke & Co., Boston, Mass., $475; 153, Prentiss Tool & Supply Company, New York, $393.

The Edgemore Iron Works, Wilmington, Del., has been awarded contract for four boilers, stokers and superheaters for the Philadelphia navy yard, at $46,189.

Under bids opened August 10, Circular No. 456, for supplies for the Isthmian Canal Commission, Manning, Maxwell & Moore, New York, have been awarded class 3, eleven radial drilling and counter-sinking machines, $414.

The B. F. Sturtevant Company, Hyde Park, Mass., has been awarded, class 185, three motors, $286.50, under bids opened August 25 for machinery for the navy yards.

The Detrick & Harvey Machine Company, Baltimore, Md., has been awarded, class 41, one universal drilling and boring machine, $6335, under opening of September 1, for machinery for the navy yards.

The following awards have been made for machinery for the navy yards, bids for which were opened September 8:

Falls Rivet & Machine Company, Boston, Mass., class 171, one tapering machine, $473.30.

Newton Machine Tool Works, Philadelphia, Pa., class 172, one rotary slotting machine, $4960.

Larkin Pipe Expanding & Flanging Machine Company, Philadelphia, Pa., class 173, one pipe expanding and flanging machine, $10,000.

The following awards have been made for machinery for the navy yards, bids for which were opened September 15:

Henshaw, Bulkley & Co., San Francisco, Cal., class 31, one engine lathe, $5385.

Niles-Bement-Pond Company, New York, class 32, one steam hammer, $558.

Lake City Engineering Company, Erie, Pa., class 131, one vertical centrifugal pump, $627.61.

George S. Fowler, Washington, D. C., class 182, two hydraulic jacks, $250.

General Electric Company, Schenectady, N. Y., class 195, two electric motors, $475.

The following awards have been made for machinery for the Isthmian Canal Commission, bids for which were opened September 14, Circular No. 462:

Independent Pneumatic Tool Company, Chicago, Ill., class 34, six pneumatic air drills, $287.40.

Manning, Maxwell & Moore, New York, class 38, four marine motors, $719.

Tucker Tool & Machine Company, New York, class 40, two wet emery grinders, $102.90.

Trade Publications.

Crucible and Open Hearth Steels.—The Vulcan Crucible Steel Company of Pittsburgh, works and general offices at Aliquippa, Pa. Catalogue No. 4; 3¼ x 6 in. Describes in particular the various grades of tool steel made by this company, including Vulcan and Hecla. Gives classification and price-list of flat and other shapes of tool steel as well as die blocks and disk classification, also catalogues open hearth machinery steel, file steel and gives tables for computing the weight of cast steel, flat bar steel, and other miscellaneous information.

Core Drills.—Ingersoll-Rand Company, 11 Broadway, New York. Folder. Advocating the Calyx diamondless core drill, which has a steel cutter for soft and medium rocks and chilled shot for harder material. It removes cores from 1⅝ to 15 in. in diameter to all depths to 6000 ft, and is claimed to be particularly useful in undeveloped mines to ascertain at a low expense the value of the ore drifts. Records of performances of the drills are given, together with illustrations showing apparatus in action.

Railway, Mill and Factory Supplies.—American Supply Company, Mobile, Ala. Catalogue, 6 x 9 in., 28 pages. Lists a general line of railway, mill and factory supplies carried by the company, together with logging tools, Welderine, a compound for mending castings, and Asco Babbit metal. The company also sells general machinery. A number of engines and boilers on hand are listed in the catalogue.

Power Pumps.—Dean Brothers Steam Pump Works, Indianapolis, Ind. Catalogue No. 71, 6 x 7¼ in., 40 pages. Lists a general line of power driven pumping machinery and shows numerous illustrations of the company's standard lines, including air compressors, blowers, condensers and air pumps, hydraulic pumps, piston pumps, vertical pumps, duplex and single vacuum pumps, &c. A sectional view of a standard duplex geared power pump is shown, with the parts of apparatus numbered to facilitate ordering repairs.

Oiling Devices.—The Winkley Company, Detroit, Mich. Catalogue, 6 x 8 in., 20 pages. Illustrates and lists oil hole covers in various sizes and designs, constant feed oil cups, grease cups made of steel or brass, dowel pins and other specialties. A view of the company's recently completed concrete, steel and factory building is shown.

Transformer Steel.—General Electric Company, Schenectady, N. Y. Publication No. 3687. Describes the manufacture of the steel used in the company's transformers. Illustrations showing views of the company's foundry, where the steel is made, are given, and attention is called to the improved type H transformer.

Motors and Meters.—General Electric Company, Schenectady, N. Y. Bulletins. No. 4611 shows a number of sewing machine motors. These are supplied with a jaw clamp foot so that they can be readily attached to the machine. No. 4612 shows the type D K automobile instrument, a combination ammeter and voltmeter inclosed by dust and moisture proof aluminum case. No. 4615 describes the Thompson direct current test meter, type C B-2, which is inclosed in a wooden case and furnished in two ampere ratings: 1, 2, 10, 20, 40 ampere, or 5, 10, 50, 100 ampere, each with a single 110-volt or double 100—220 volt potential windings.

Refrigerating Fittings and Supplies.—The Arctic Ice Machine Company, Canton, Ohio. Catalogue, 9 x 9 in., 151 pages. Embraces a full line of fittings for ice making and refrigerating equipment. Five types of ammonia fittings and valves are shown, and tables useful in the manufacture of ice and conduct of refrigeration plants are included in the volume.

Condensing Apparatus.—Alberger Condenser Company, 95 Liberty street, New York. Catalogue No. 8, 6 x 9 in., 95 pages. An introduction reviews the use of Alberger condensing apparatus in large plants and power houses and briefly and concisely explains their operation. The Alberger barometric condenser and the Alberger centrifugal condenser are fully illustrated and described.

Mining and Contractors' Hoists.—Foos Gas Engine Company, Springfield, Ohio. Catalogue. These hoists are made in several combinations, the engines being in sizes from 15 hp. up and adaptable for operation with gasoline, kerosene or alcohol. The standard machine is illustrated and described, one of the advantages claimed for which is that the clutch is locked on the engine shaft and not inside of the cable drum. The machine is so arranged that the operator faces the engine and shaft and the speed of the engine can be controlled by the aid of the lever from any distance.

HARDWARE

A MOVEMENT with which the merchants of the country will probably have to reckon is the plan for the welfare of the farmer, in regard to which the recently appointed agricultural commission will be making its report. Just why the farmers should have been selected for this semiphilanthropic work at this time is not announced. The important fact with which the country will be confronted is the paternalistic development that will probably be called for in the attempt to carry out the project. While it is undoubtedly true that something might be done to better the conditions of rural life, provided the farmer is taught to help himself instead of having help obtruded upon him, there is grave danger that this whole movement will be discredited by measures devised exclusively for the farmers' benefit without a balanced consideration of their effect on other interests and the country as a whole. Already individuals and newspapers are mapping out programmes in the interest of the farmer which are calculated to fill the taxpayer with apprehension. In endeavoring to advance the interests of the tillers of the soil there is danger that the interests of other classes will be overlooked or sacrificed, and the country move with an accelerated pace in the direction of socialism.

It is a little odd that this subject should be taken up at a time when the farmers are as a rule exceedingly well off and enjoying a prosperity which might well make them objects of envy to the commercial and industrial classes, to wage earners and to the great masses of the people. An inquiry in regard to measures for uplifting the lower strata in the towns and villages and especially in the great cities would seem to be more timely. Problems which concern the congestion of population and conditions in some of the industrial and commercial centers are certainly more grave than those relating to the farmers, who are proverbially well to do, owning the land they cultivate, living an independent and comfortable life, and enjoying, with the prospect of continuing to enjoy, a large measure of prosperity.

It is entertaining and at the same time suggestive to note some of the means by which the lot of the "poor farmer" is to be alleviated.

Parcel Post is, of course, named as one of the remedial agencies which is going to do wonders for the farmer, because it keeps him in close touch with the markets, both as buyer and seller. With a Parcel Post he will be able to deal with catalogue houses in the great cities, no matter how distant they may be, and thus purchase his cutlery, and perhaps his Tin Ware, and certainly many other articles of moderate though considerable size, from the far off cities instead of the nearby town. So in regard to the marketing of his products: One of the newspapers owned by the author of one of the Parcel Post bills in the Fifty-eighth Congress declares that the first work of the farmers' commission should be to provide a Parcel Post so that he may "send his dozen eggs or his pair of chickens direct to the man that wants to eat them, or, at least, to the retail merchant."

The suggestion that country schools should be improved and special and expert instructors in the science and art of agriculture be provided may have some merit and is not novel, but the proposition, as made by a great metropolitan newspaper, that stages or motor busses be used to collect the children and return them to their homes, Congress appropriating funds for this purpose, is calculated to startle conservative taxpayers.

In connection with the carriage of merchandise in the mails it is proposed, too, that the Government provide a cheap telegraph system to keep the farmers in touch with the larger markets, so that the products of the dairy, the poultry yard and the field may be sold to the best advantage to consumers or merchants without having to deal with middle men.

Agricultural machinery of approved type costs a good deal, and many farmers cannot afford to purchase a complete outfit on their own account. The Government is therefore to establish warehouses throughout the country at which farmers can obtain up to date implements and machines at a moderate rental.

Power, too, is very useful on farms conducted on modern principles, and the State or national Government is to furnish the electrical current by which the operations of the farm can be carried on and the rented machinery operated.

Without attempting to complete the catalogue of proposed benefactions, it may be mentioned in passing that the Government is to build warehouses in which the crops can be stored until it is time to sell them to the best advantage, thus enabling them to realize better prices than those at which they are now getting rich.

In addition to all this, a co-operative system is recommended by which the farmers will unite their purchases of supplies and articles required by them, thus making them independent of near-by merchants and presumably enabling them to effect important economies. The commission merchant, the wholesaler, the retailer, the private ownership of railroads, express companies and other enterprises connected with transportation and merchandising, are to be cut out so that the farmer can secure for his products all the price paid by the consumer.

It is not unlikely that the work of the commission will result in good, for its members are men of recognized ability, who will, it may be presumed, take a broad and sensible view of the matter entrusted to them. They will be called upon to consider a phase of the subject which is not touched upon by any of the theorists whose vagaries are referred to in the preceding paragraphs. It must be remembered that the country villages and towns are essential to the welfare of the farming communities in the midst of which they are located. Blot out the towns and villages and farming life becomes intolerable. A prosperous community which is a social and commercial center, with its railroad and trolley lines, its well stocked stores, its up-to-date schools, its opportunity for culture, its inviting churches, its physicians and lawyers, perhaps its factories, and with its prosperous population, contributes directly and indirectly in many ways to the comfort, contentment and uplifting of the farmer's life. The decay of country towns and villages in many States and the passing of the wholesome type of life they represent is one of the lamentable facts which obtrudes itself upon the attention of those interested in rural conditions. This has not a little to do with the real disadvantages of the farmer's lot. The problem before the commission is broader than it appears at first blush, probably broader than its members realize, or than the President realized when he made the appointment. The work of the commission will include the recommendation of measures for the welfare of the towns and villages as necessary to the best welfare of the farmers who live in their vicinity.

Condition of Trade.

There is little change in the general situation, but on the whole, notwithstanding the fact that the demand is somewhat disappointing to those who were expecting a more radical revival of business, there still continues to be a better feeling and an increased movement of merchandise from the stores of the distributors, wholesale and retail. Winter goods which are called for by the needs of the people are in very fair demand, although even in this field the volume of business is not up to normal. That a good deal of building is going on is indicated by the fact that some at least of the manufacturers of tools are well occupied, and in Builders' Hardware the factories report an increased demand. The diminished cost of building doubtless contributes to this state of things. Many enterprising Hardware houses are getting ready for the holiday trade, a department to which more attention is given year by year. That it is not overlooked this year is another indication of the substantial prosperity of the people whose economies are not pruning things so closely as to cut off all the refinements and luxuries. The well-being of the agricultural sections has been noted repeatedly, but it is gratifying to observe the improvement in some of the manufacturing States. Centers in which heavy goods are consumed by railroads and in large enterprises are still suffering, with signs, however, of a decidedly more cheerful tone in their reference to the market and the prospect for business. The improvement in New England, whose Hardware products go to every section of the country, is illustrated in the better state of things in New Britain, where the factories, which are so thoroughly representative of the Hardware industry, are feeling the stimulus of a better condition of trade. The common experience is that the impetus comes largely from the Middle West, and particularly from sections that do not depend largely upon manufacturing interests for their prosperity, such as the more important parts of the East. All of the large New Britain houses report an increase in the volume of their orders, a condition which has been especially noticeable during the last two weeks. With one of the largest New Britain companies the September totals a few days ago equaled those for the corresponding period of 1907 when business was good. the slump not having been felt to any marked extent. The near approach of normal conditions is shown in the fact that the New Britain factories are increasing production by larger working forces and longer schedule of hours, as in some cases a 55 hr. a week basis has been resumed and in others a 50-hr. basis. This condition of things probably prevails in many other manufacturing towns and States whose products are not too closely dependent upon a demand for railroad work and heavy construction.

Chicago.

The changing moods of the market make it plain that the time for steady, uninterrupted improvement in business has not yet been reached. A week of promising development is followed by one of sluggish trade, which in a measure nullifies the results of short lived activity, and so in the see saw movement advances made do not loom large in the final aggregate. The events of last week were marked by counter currents of influence which have had a tendency to check progress in some directions. First in importance among these is the prolonged drought, which in several of the wheat growing States of the Middle West has interfered with fall plowing to such an extent that the wheat acreage will doubtless be considerably curtailed. This, of course, has no immediate bearing upon present conditions, and but for the extreme sensitiveness of the market to every breath of circumstance would not perhaps produce noticeable results. As it is, however, such things are for the moment apt to obscure, or at least overshadow, the power of wealth that lies in the fairly abundant crops already safely harvested. Then, too, the forest fires that for some weeks have been raging with disastrous effect in the northern portions of Michigan and Wisconsin, and in other sections of the country to less extent, have operated adversely to trade in cutting off business of considerable volume. The burden of this loss is more directly felt by the jobbers and manufacturers more nearly in touch with the localities affected, but in the end it reacts upon the general market. Notwithstanding the obstacles to improvement, it now looks as if September would compare favorably with August in sales totals; under ordinary conditions it should show decided gains, since trade at this season usually begins to recover from the summer dullnes. There is but little change observed in the general level of prices, and it is noted that some lines which have shown more or less irregularity have firmed up, with occasionally slight advances. As a result of a recent understanding, Register faces from 10 x 14 and larger have advanced from 75 and 10 to 75 per cent. off. Orders for Builders' Hardware are increasing in number, but are still restricted in size to cover present needs. On the whole no material change in the situation is looked for for another month at least, when it is hoped that some elements of uncertainty and doubt now clouding the horizon will be removed and business interests will again receive the undivided attention of the trade.

Portland, Oregon.

FAILING-MCCALMAN COMPANY.—Conditions in the Pacific Northwest continue to show a steady improvement. Business continues to grow and new people are continually coming into this territory. The railroad lines have recommenced construction and are now opening up new territory tributary to Portland which it has never been possible to cultivate. Taking it altogether, we should say that unless we have an unexpected setback business will continue to improve, and the year 1908 will come very near to equalling 1907 in the amount of business done in Portland territory and the year 1909 will far surpass anything that we have ever experienced out here. Of course should the result of the election be to demoralize business we would undoubtedly suffer with the rest of the country, but we do not believe that our suffering would be in anything like the same degree as the Eastern sections. But we are not losing any sleep over the result of the election in this part of the world.

We hope the rest of your readers find the business outlook as cheerful as we do in this territory.

Omaha.

LEE-GLASS-ANDREESEN HARDWARE COMPANY.—This market, including other jobbing centers located on the Missouri River, offers no new or particularly interesting features from those recorded in recent reports.

Business in all lines continues satisfactory and the volume of goods going into consumption daily progresses with a steady regularity. The large crops of all kinds and high prices for everything produced by the agriculturist would indicate that no let-up in the extent of business is at all likely. There is nothing in the situation at the present time, nor any developments in sight, calculated to disturb the satisfactory volume of business now being enjoyed.

A large amount of building is in progress, consequently labor of all kinds will be well employed until the winter season stops outdoor operations. If other sections of the country were enjoying equally fortunate circumstances no complaints would be heard from any source.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—Any stranger visiting this city during the past week would not have thought that such a thing as a panic or hard times had ever been heard of in this part of the country. Last Saturday afternoon the deciding baseball game for the pennant for the Southern League was played and over 12,000 people were in attendance, the largest crowd ever

on a Southern baseball field. For the past six days the annual Tennessee State Fair has been held in this city and the crowds have been enormous, breaking all past records. Evidently the people have time to spare, and money, too, and intend to enjoy themselves.

To come down strictly to business, however, and look the situation square in the face, we will have to admit that it is not very satisfactory. Orders are more plentiful than they were in the early part of the summer, but they are not very large and quantities are small, and there seems to be a hesitancy all over the country to do much trading. While crops are going to be good in the South, they will fall somewhat short of expectations. The decline in the price of cotton has also had some effect on trade in this section. Prices are being very well maintained, Southern pig iron being very firm. Collections just now are rather light, but after October 15 the money from the Southern country will begin to come in.

St. Louis.

NORVELL-SHAPLEIGH HARDWARE COMPANY.—Notwithstanding the long dry spell we have experienced in a large part of our territory business is good. September will compare more favorably with last year than any month up to this time. In fact, we are hoping, when all the September figures are in, to show a small increase over last year.

We believe October will be a very good month. Merchants have not bought goods early, their stocks are very low, and if we have some sharp, frosty, cold weather in October it will stimulate business on seasonable goods. In both the months of August and September mail order business—that is, orders sent in by mail direct from the trade—shows a substantial increase over last year. This is a very healthy indication. It is the best sign that stocks of the retail trade are low.

Another indication of confidence in the situation is in the number of new stock orders being sold and the large number of inquiries we are receiving from clerks seeking good locations to start into business for themselves. We are also glad to see a considerable improvement in our city business. This must mean that manufacturers are resuming work and that mechanics and laborers are being employed. The railroads are also being compelled to place specifications, and business in our railroad supply department is much better than it has been.

There are prospects for a fine crop of cotton in Texas and the merchants in that section, who have passed through a long, trying ordeal, have been buying goods. They still are conservative, but most of our Texas salesmen report they will have a good business the rest of this year. Collections are quite satisfactory.

Taking the situation all in all, we have every reason to congratulate ourselves that normal times are again with us. Politics, of course, will cut some figure for a few weeks longer. Our political friends, however, seem to have a good deal of difficulty in stirring up much excitement or enthusiasm. In the meantime many of our salesmen are doing a good business on Campaign Whips and Campaign Pocket Knives.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—There is to be quite an important bankers' meeting at Denver, Colo., during the present week, to which several banks in our city are sending delegates high in authority. It is a well-known fact that the banking deposits of the entire country have increased, and the balances held by the banks are far larger than they were one year ago, if they are not larger than they were when the crisis of October, 1907, began; but the question is being asked by many bankers through the country, What are the present conditions of trade and what is expected during the next 30 or 40 days?

These are difficult questions to answer in any one particular location. In this location manufacturers have increased the number of workmen employed and naturally their trade has increased. The retail trade generally complain of the difficulty they have in making collections, as many persons appear to be holding on to their funds until a later date, consequently it is difficult for them to pay the jobbers they purchase from; and, of course, collections from the trade are important because jobbers are compelled to pay promptly for all the goods they buy from manufacturers.

But in regard to trade there is considerable in our various papers about election and it is thought by many in the trade throughout the country that business will not increase until after the election. We hope, however, that the effect of the election will be that trade will gradually increase during the next four years as it did during the past four to six years up to October, 1907, or, we might practically say, up to January 1, 1908, as trade did not largely fall off until the latter date.

General railroad business has recently increased, and it is estimated that over 50,000 freight cars have been added from September 1 to 17, which shows an increase in trade as well as an increase of employees, and it is estimated that railroad traffic will increase largely between this and December 1. Purchases of raw materials have increased, the agricultural products throughout the entire country show the net result as an increase, and, of course, they bring the cash; agricultural exports as well as cotton exports have increased over the same time one year ago, and the general demand for labor is far greater than it was a few months ago.

The celebration of the two hundred and twenty-fifth anniversary of the city of Philadelphia, designated by the city authorities as Founders' Week, will begin Sunday, October 4, and continue until Saturday, October 10, during which time there will be a wonderful display and parade of manufactured products. How Philadelphia stands and what has been accomplished during the past 225 years is not confined entirely to the city of Philadelphia, but the records of the entire United States are something wonderful and surpass anything in the history of the world. The particulars of what will be going on during Founders' Week are published by the various papers of the city, and it is estimated by the railroad companies that the presence of out of town visitors during the week will be 50 per cent. greater than the large number who attended the Centennial Exposition or World's Fair in 1876, which fair, we think, was the only one held in the United States where the city paid the entire expense account. The general government loaned a sum of money which was duly paid back at time specified.

The Founders' Week celebration begins on Sunday, October 4, largely with special services in churches of various denominations, and an open air service in Fairmount Park. Monday, October 5, will be Civic and Military Day, with a parade of soldiers, sailors and marines at 1 p.m., under command of Gen. Frederick D. Grant, and in the evening a municipal celebration at the Academy of Music. Tuesday, October 6, will be Municipal Day, with a parade in the afternoon of the Police and Fire departments. Wednesday, October 7, will be Industrial Day, with 150 floats, illustrating the evolution of industries. Thursday, October 8, will be Children's and Naval Day, with a review in the afternoon of war ships on the Delaware River. Friday will be Historical Day, with marching men in costume, and Saturday, October 10, will wind up the celebration with athletics and a Knights Templar review and fireworks in the evening. During the entire week more will be going on than can be named at the present time.

Louisville.

BELKNAP HARDWARE & MFG. COMPANY.—The drought, the heat and politics seriously affect our thoughts and efforts, not to say our pocketbooks, these days, and the only wonder is that the volume of current business has not been even more diminished. As it is, there has been during this month probably larger volume than at any time since the panic, if we except a couple of weeks in August, when a rather unusual movement started a small boom or induced sundry optimists to predict one. There is no nostrum for sale on the street corners yet which can be guaranteed to produce prosperity. The expense account has scarcely yet been brought into proper proportions with all the study, self-denial and compression that has been brought to bear upon it. For months after the debacle salary lists were undisturbed, or practically so, in the hope that recuperation would be prompt,

so the unpleasant necessity of reduction in any shape would not have to be resorted to. But the natural laws are bound to work, and when the balance did not appear on the right side retrenchment became the order of the day. We now observe that the railroads, for instance, have reduced their operating expenses by degrees, so that even a much lower gross earning leaves something on the plus side. So far, however, it is so little that their plea for higher freight rates is not without some reason and must be listened to despite the clamor of demagogues. It is rather a peculiar state of affairs when the public, not to say irresponsible writers for the daily press, and howlers on the stump, undertake to say that there should be no advance in rates on any commodity under any condition; in other words, the railroad rates differ from all other market measures, in that they may be put down but not up, that they may de decreased but not increased. Why is this?

The fact is it is very easy to underrate the necessary operating expenses of steam railroads, traction lines or telephone companies and call upon State commissions or legislative bodies to make such arbitrary and sweeping reductions that the service shall be seriously impaired. It looks, for instance, as though the 3-cent street car fare in Cleveland, which was a very popular measure for the time being, is doomed to failure, since it apparently costs more than that to haul a passenger.

It is easy to say that business telephones in certain communities should not cost over $1, but who is to determine where the dead line is—if $1, why not 50 cents? That process of reasoning, unless it is a matter of arithmetical demonstration, is pretty nearly worthless. The watered stocks, of which we hear so much, may not more than represent the rights of way and terminal facilities. In other words, the regulation of the public utilities by the populace may be productive of great injustice. After all competition will, as a rule, solve the difficulty, if there be ever handed justice all around.

If the steam roads furnish dirty cars and at long intervals, the traction lines will soon parallel them and capture the traffic. To undertake to control legislatures, State or national, and to keep very highly paid attorneys in the employ of the company probably results in the necessity for higher rates to get it back. But these extra expenses would not be incurred in the first place if the grafters were not so active and always disposed to look upon such public undertakings as legitimate prey.

Cleveland.

THE W. BINGHAM COMPANY.—Trade conditions in this section remain about the same as indicated in our last report. A good deal of agitation and talk is going around in manufacturing and business circles as to the best way to dispose of our surplus manufactured goods. We are such great producers we must have an outlet for our surplus. Why should not an aggressive campaign be inaugurated soon to grasp this trade for ourselves both in Asiatic and South American countries? It would seem we should have a united campaign to get a firm hold on the trade of the Orient at this time, for they seem to be in quite a receptive mood. It looks to us if we had the right consular service, backed up by the right kind of legislation, the problem would be easily solved. Agitation along these lines is quite prominent nowadays.

The general Hardware trade among the country merchants has been very good with us, and we hardly think the present political agitation is having very much effect on them. The large corporations, however, may be holding back a little, in order to know just what the future policy of the Government may be, but the general disposition seems to be to forge ahead in a safe, conservative way.

NOTES ON PRICES

Wire Nails.—Business at the mills is satisfactory in volume, though orders are confined to a large extent to small lots. Specifications on contract orders are also being received. Jobbers generally are not anticipating requirements, but are keeping stocks down to moderate quantities, notwithstanding the fairly liberal movement from their warehouses. Prices are well if not inflexibly maintained. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers	$1.95
Carload lots to retail merchants	2.00
Less than carloads to jobbers	2.00
Less than carloads to retail merchants	2.10

New York.—The last two weeks of September demand has not shown as much activity as during the first half of the month. Merchants continue to purchase, more or less frequently, in small quantities. Nails are held on the basis of $2.30 per keg in small lots at store.

Chicago.—New orders are fairly numerous, though the effect of continued drought in the West and forest fires in the North, have in the past week or two had a slightly retarding influence. Shipments are going forward from mills at a satisfactory rate, and, because of the desire of buyers to hold their stocks at a minimum, prompt deliveries are being insisted upon. On the whole, there is no ground for serious complaint with the present state of activity in the demand for Nails. Prices, it is said, are firmly held at the recognized schedule. Quotations are as follows: $2.13 in car lots to jobbers, and $2.18 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—New orders in Wire Nails are holding up remarkably well, and a good deal of new business is being booked by the mills, which with specifications against old contracts is giving them almost a normal amount of work. Buying is largely confined to small lots for actual needs, but in most cases orders are accompanied with the request for prompt shipment, showing the stocks in the hands of jobbers are light. So far there is not much inclination on the part of the large trade to take in Nails beyond actual requirements. We are advised that prices are being very well maintained. Quotations for base sizes are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers	$1.95
Carload lots to retail merchants	2.00

Galvanized Nails are quoted at $1 over the price of the regular Nails.

Cut Nails.—Buying is confined to small lots, and orders are not frequent enough to aggregate a large tonnage. There is no evidence that the trade is desirous of accumulating stocks, but the disposition is rather to pursue a hand to mouth policy in purchasing. The general price is $1.80, base, per keg, f.o.b. Pittsburgh, but this price continues to be shaded to the large trade. In the Western market Iron Cut Nails are held at an advance of 10 cents per keg over Steel Cut Nails, but this differential is not observed in the East.

New York.—The local market remains comparatively quiet, requirements for Steel Cut Nails being moderate. Nails are held on the basis of $2.15 per keg for small lots at store.

Chicago.—While a limited amount of business is moving all the time, it is made up of small orders which in the aggregate represent only a moderate tonnage. Jobbers' stocks, though not on any hand extensive, require but infrequent orders for replenishment. Prices are held close to current quotations, except for especially desirable specifications, which may be shaded 5 cents a keg. We quote Chicago prices as follows: In car lots to jobbers, Iron Cut Nails, $2.08; Steel Cut Nails, $1.98. In small lots from store: Iron Cut Nails, $2.25; Steel Cut Nails, $2.15.

Pittsburgh.—An improvement in demand for Cut Nails from the Western trade is reported, but new orders from the East do not show any betterment, and are relatively few and for small lots only. Buyers are not accumulating stocks, but are buying from hand to mouth. The general market is $1.80, base, per keg, f.o.b. Pittsburgh, but $1.75 is made, on carloads and over, to the large trade. In the Western market Iron Cut Nails are held at an advance of 10 cents per keg over Steel Cut Nails, but this differential is not observed in the East.

Barb Wire.—The demand from mill continues moderate, and is confined to small lots for immediate requirements. An active fall demand has not yet begun. Regu-

lar quotations are reported as being maintained. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots	$2.10	$2.40
Retailers, carload lots	2.15	2.45
Retailers, less than carload lots	2.25	2.55

Chicago.—The demand for fencing has felt the effects of drought in the West more, perhaps, than other Wire products. The advent of early rains, it is hoped, will relieve the situation and that trade, though possibly retarded somewhat, will open up satisfactorily a little later. As it is, a fair amount of new business is coming out, notwithstanding the drawbacks noted. Prices, it is said, are steadily maintained at regular quotations. Quotations are as follows: Jobbers, Chicago, car lots, Painted, $2.28; Galvanized, $2.58; to retailers, car lots, Painted, $2.33; Galvanized, $2.63; retailers, less than car lots, Painted, $2.45; Galvanized, $2.75; Staples, bright, in car lots, $2.25; Galvanized, $2.55; car lots, to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—There is some slight betterment in new orders being placed, but as a rule these are for small lots only, for actual needs An improvement in the situation is expected when fall trade starts, which it should in the very near future. The manufacturers advise us they are absolutely maintaining prices. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots	$2.10	$2.40
Retailers, carload lots	2.15	2.45
Retailers, less than carload lots	2.25	2.55

Plain Wire.—Activity is represented largely by specifications on contract orders, although some new business is being placed by the mills. Regular prices are reported as being maintained. Quotations per 100 lb. to jobbers in carload lots are as follows, on a basis of $1.80 for Plain and $2.10 for Galvanized, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days, the price to retailers being 5 cents additional:

Nos.	6 to 9	10	11	12&12½	13	14	15	16
Annealed	$1.80	1.85	1.90	1.95	2.05	2.15	2.25	2.35
Galvanized	2.10	2.15	2.20	2.25	2.35	2.45	2.85	2.95

Chicago.—Fence makers and other Wire users are specifying against contracts in a fairly liberal manner, though not as a rule going far ahead of present requirements. The mills are fairly well engaged, but are able to make prompt shipments, which are generally demanded by buyers. Prices are, it is stated, being rigidly maintained. We quote as follows: Car lots to jobbers, $1.98, f.o.b. Chicago, and to retailers, $2.05.

Pittsburgh.—There is a fairly active demand, and recently more disposition has been shown by the large trade to anticipate requirements. Specifications against contracts are coming in quite freely, and shipments by the mills are heavier than for some time. Regular prices are said to be absolutely maintained. Quotations per 100 lb. to jobbers in carload lots are as follows, on a basis of $1.80 for Plain and $2.10 for Galvanized, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days, the price to retailers being 5 cents additional:

Nos.	6 to 9	10	11	12&12½	13	14	15	16
Annealed	$1.80	1.85	1.90	1.95	2.05	2.15	2.25	2.35
Galvanized	2.10	2.15	2.20	2.25	2.35	2.45	2.85	2.95

Padlocks.—No action of general interest or importance was taken by the manufacturers of Padlocks who were in session last week in this city. The market presents a continued appearance of uniformity and makers show little disposition to make concessions from established quotations.

Pocket Cutlery.—Prices on American Pocket Cutlery have recently shown a little irregularity. Leading manufacturers, however, refer to the matter as representing concessions necessary to secure business on the part of a few smaller makers and state that no changes may be expected on standard brands. Some improvement in volume of business is reported.

Registers.—Manufacturers of Registers have made an advance in smaller sizes of Register Faces, 4 x 6 to 14 x 14 in., japanned, bronzed and plated, to 70 per cent. discount. This is effective October 1.

German Coil Chain.—Consequent primarily to lower prices from the other side, some declines have been registered in German and German pattern Coil Chain. On German Chain, larger sizes, the market may now be represented by a discount of 70 per cent., and on American made Chain by a discount on 6—0 to 1 of 70, 10 and 5 per cent.

Shears and Snips.—A tendency to weakness has been observed in the market for Shears and Tinners' Snips, competition being increasingly keen. Current quotations may be represented by a quotation on Straight Trimmers of 70, 10 and 5 per cent. for japanned and 60, 10 and 5 per cent for nickel. On Tinners' Snips, steel laid blades, a discount of 50 and 10 may be mentioned.

Bright Wire Goods.—A conference of Bright Wire Goods manufacturers is being held this week in an effort to tone up the market and correct such irregularities as have recently been referred to in these columns.

Machinists' Hammers.—A reduction in prices, which goes into effect to-day, has been made by manufacturers of Handled Hammers affecting the Ball Pein, Straight Pein and Cross Pein Machinists' Hammers. These goods are 7½ per cent. lower, and may now be quoted in a general way at a discount of about 70 per cent.

Snaths.—Quotations on Schythe Snaths for next season show practically no change from last year. The market to retail trade may be represented by a discount of 50 and 10 per cent.

Window Glass.—The work of getting signatures to the Manufacturers' Organization Agreement is said to be progressing, while workmen are making united efforts to secure better wage agreements. Developments along both of these lines will be looked for with interest. The local demand shows a slight improvement, but purchases are restricted to immediate requirements. It is reported that regular quotations are not always strictly adhered to. Manufacturers' discounts, for hand blown Glass, from manufacturers' list of January 1, 1901, are as follows: For A single and double strength Glass, 90 and 15 per cent.; for B single and double strength Glass, 90 and 20 per cent. Eastern jobbers' quotation from jobbers' list, October 1, 1903, for all sizes of single and double strength Glass, covering the territory east of Chicago, is 90 and 20 per cent. discount.

Rope.—A gradual improvement is reported in business, orders being more frequent, and some of them for quite respectable quantities. While the demand is not up to the average of last year at this time, the moderate improvement shown is encouraging, viewed in the light of general market conditions during the past month. General quotations for Rope 7-16 in. in diameter and larger are as follows: Pure Manila, 9 cents; Pure Sisal, 7 cents; No. 1 Jute, ¼ in. and up, 5½ cents; No. 2 Jute, ¼ in. and up, 5 cents.

White Lead in Oil.—The market is inactive, the demand being restricted to nearby requirements. The easier position of pig lead has not brought lower prices for the finished product which consumers anticipated. Corroders maintain that much of the pig lead in their hands was purchased at a higher price than rules at present, and that a lower price for the finished product is not necessarily warranted. Quotations for best brands of White Lead are unchanged, as follows: In 100, 250 and 500 lb. kegs, 7 cents per pound, with the regular advances for smaller packages.

Linseed Oil.—According to press reports, a sale of 1000 barrels of out of town Oil for October-December delivery, was recently made at 40 cents. Whether this is correct or not it indicates the possible price which might be made for a round lot of this kind. The general tendency of purchases is to confine orders to small quantities. Seed is reported as coming to distributing points more freely than last year, which if continued will probably affect the Oil market. Quotations are as follows: State and Western Raw in small lots, 42 cents per gallon; City Raw, 44 to 45 cents, in small lots per gallon. Boiled Oil is 1 cent advance on Raw.

Spirits Turpentine.—The proposed organization of a marketing company to regulate the sale of Turpentine in

the State of Florida is thought to have reduced the receipts to some extent at primary points. Local prices remain unchanged and buying is confined to small lots. The New York market is represented by the following quotations: Oil Barrels, 38 to 38½ cents; Machine Made Barrels, 38½ to 39 cents per gallon.

Price-Lists, Circulars, Etc.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our Catalogue Department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

ELMORE TOOL MFG. COMPANY, Hartford, Conn.: Catalogue illustrating the Elmore Indestructible Screw Drivers in large variety; also Ice Picks, Scratch Awls, Nail Sets, Punches, Chisels, Nail Pullers, Gas Pliers, Wire Cutters and Pliers, Shoemakers' Hammers, Combination Hatchets, &c.

ELLER MFG. COMPANY, Canton, Ohio: Illustrated circular devoted to Corrugated Iron with deep corrugations, Continuous Ceiling Sheets, Special Ridge and Hip Roll and Special Valley; Pressed Steel Brick, Rock Faced Brick and Siding, Crimped Roofing, Iron Weather Boarding, Galvanized Standing Seam Steel Roofing, Lock Seam Tin Roofing, &c.

S. KEIGHLEY METAL CEILING & MFG. COMPANY, Pittsburgh, Pa.: Folder containing attractive two color leaflets, illustrating, describing and listing several styles of Phœnix Steel Lockers.

LEFEVER ARMS COMPANY, Syracuse, N. Y.: Illustrated catalogue of High Grade Hammerless Shotguns and Ideal Gun Cleaner. Catalogues will be furnished to merchants on request in such quantities as are required.

E. T. FRAIM LOCK COMPANY, Lancaster, Pa.: Catalogue No. 18 illustrating and describing Pressed Steel, Wrought, Cast and Malleable Iron, Steel, Bronze, Brass, Nickel and Aluminum Padlocks, and Night Latches. A full page engraving shows the company's factories, and the attention of the trade is called to various new lines designed and many improvements of merit in old lines.

REED MFG. COMPANY, Kalamazoo, Mich.: Illustrated booklet relating to Robin Hood Axes, Boys' Handled Axes; Lathing, Claw, Shingling and Half Hatchets, Upholsterers' Hammers, Nail Hammers and Sidewalk Cleaners.

E. W. ROSS COMPANY, Springfield, Ohio: Catalogues devoted to Silo Filling Machinery, Manure Spreaders, Feed Cutters, Fodder Shredders, Ensilage Cutters, Horse Powers, Wood Saws, Silos, &c.

GENERAL ROOFING MFG. COMPANY, East St. Louis, Ill.: Folder devoted to Prepared Roofings, Deadening Felts, Red Rosin Sheathings, Plaster Boards, Tarred Felts; Rubber, Sand Coated and Mica Spar Roofings; Asphalt, Stringed, Slaters' and Saturated Felts, Roof Coating, Asphalt Paint and Asphalt Roofing Cement.

COLUMBIAN ENAMELING & STAMPING COMPANY, Terre Haute, Ind.: Catalogue and price-list illustrating Turquoise, Columbian Gray and Onyx Enameled Ware.

KELLEY-HOW-THOMSON COMPANY, Duluth, Minn.: Fall and winter catalogue No. 51 devoted to Sporting Goods. On a slip attached to the catalogue is the following: "He who spends no time examining catalogues, pays a high price for such saving of time."

AMERICAN ELECTRICAL NOVELTY & MFG. COMPANY, 304-308 Hudson street, New York: Catalogue of Ever Ready Electric Novelties, covering a varied line of small electric devices.

THE J. STEVENS ARMS & TOOL COMPANY, Chicopee Falls, Mass., has prepared a series of six double column mortised newspaper advertising plates featuring hunting scenes, designed for the use of merchants. The plates have sufficient space for the merchant's own announcement, and are calculated to excite interest in the Firearms stock. The plates are furnished gratis to merchants who apply for them.

Second Annual Electrical Show.

THE second annual electrical exhibition will open on Saturday evening, October 3, at the Madison Square Garden, New York City, and continue until October 14. In scope it will include the commercial, industrial and domestic fields. Meetings of the Empire State Gas and Electric Association and various other organizations will be held during the exhibition period, and on October 8 there will be a meeting to consider subjects relating to tuberculosis. Among the leading exhibitors are the General Electric, Edison, Westinghouse, Marconi Wireless and other electric companies. There will be exhibits of actual wireless telephony, the four instruments being connected with a station in Times Square and the messages being reproduced on electrically driven linotype machines and distributed to the public. A fine exhibit of paintings, loaned by the Metropolitan Museum of Art, will illustrate the fiftieth anniversary of the laying of the Atlantic cable, the Commercial Cable Company loaning other paintings to show subsequent developments. The New York Electrical Society will contribute paintings, &c., to indicate the advancement in science. Electrical history will also be shown by the first apparatus used by Thomas A. Edison in 1879 and his subsequent inventions.

Requests for Catalogues, Etc.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM G. L. GRIPTON, Britton, Mich., whose stock of general Hardware, Stoves, Paints, Oil, Glass, &c., was recently destroyed by fire.

FROM J. B. MULLANE COMPANY, Sullivan, Ind., which suffered a slight loss by a recent fire. The company handles Shelf and Heavy Hardware, Stoves, Tinware, Paints, Oils, Sporting Goods, Buggies, Carriages and Furniture. A two-story addition to the store, 40 x 75 ft., has lately been built.

FROM FERRATT HARDWARE COMPANY, Norfolk, Va., incorporated with an authorized capital of $25,000 to carry on a wholesale and retail business in Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints, Oils, Sporting Goods.

FROM GENSEMER & Co., who are about opening a wholesale and retail business in Duncannon, Pa., handling a general line of Hardware, &c.

THE INLAND EMPIRE IMPLEMENT & HARDWARE ASSOCIATION, E. W. Evenson, secretary, Spokane, Wash., has been sounding the candidates for Congress and Senate in the section covered by the association as to their attitude on the subject of domestic parcel post as advocated by the post office authorities. The result of the canvass is given in a folder recently issued, in which the position of those approached on the subject is given for or against the proposed legislation, so that the merchants of the Inland Empire may be intelligently advised as to just how the various candidates stand on this important question.

UNDER a reincorporation the name of the Davis Hardware Company, Fort Scott, Kan., has been changed to the Armstrong-Davis Hardware Company, and the capital stock increased from $10,000 to $20,000. The management of the company, which does a General Hardware and Stove business, will continue unchanged, the officers being R. T. Armstrong, president and treasurer; Frank W. Davis, vice-president; Percy Davis, secretary.

THE name of F. P. Pfleghar & Son, New Haven, Conn., manufacturer of Hardware specialties, has been changed to the Pfleghar Hardware Specialty Company.

Death of James Swan.

JAMES SWAN, treasurer of the James Swan Company, Seymour, Conn., manufacturer of fine edge tools for woodworkers, died at his home in Seymour, September 23, from a complication of ailments. Mr. Swan was born in Dumfries, Scotland, December 18, 1831. He was given a grammar school education, but at a comparatively early age he was apprenticed to learn the art of millwrighting, including work on both iron and wood. In 1853 he came to what is now Derby, Conn., and shortly after accepted a position with the Farrel Machine Shops in Ansonia, of which he was superintendent from 1858 to 1865. In the

JAMES SWAN.

latter year he accepted the superintendency of the auger and bit shops of the Douglas Mfg. Company in Seymour. In 1877 Mr. Swan purchased the entire plant, and from that time there has been marked progress in all directions. The high quality of the Chisels, Gouges, Drawing Knives, Screwdrivers, Augers and Bits, Hollow Augers, Boring Machines and kindred tools carrying the Swan emblem is universally recognized at home and abroad. Mr. Swan was president of the company until four years ago, when, on account of his advancing age, Benjamin A. Hawley of the Russell & Erwin Mfg. Company became president, Mr. Swan remaining as treasurer and in control of the business. He also was president of the H. A. Matthews Mfg. Company, Seymour, and the Seymour Electric Light Company, a director of the Ansonia National Bank, Ansonia, and a director of both the Seymour Public Library and the Seymour Trust Company.

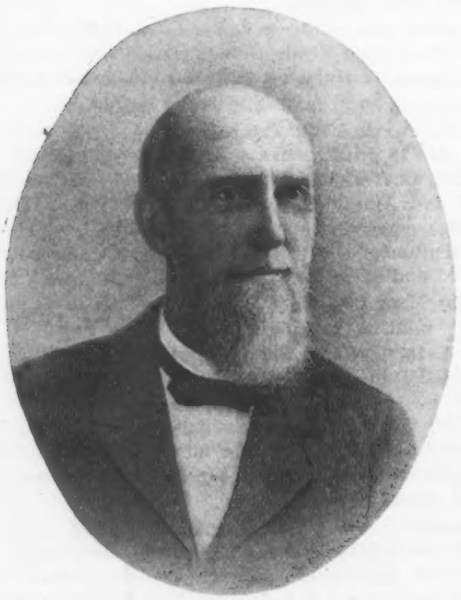
Mr. Swan gave much valuable time to public duties, both for town improvement or in the halls of legislation. To him, as president of the Board of Education, are attributed important advances in local educational matters. He was interested in the Public Library, was a member of the Citizens' Fire Department and influential in the general uplifting of civic and political conditions. He was bred a Scotch Presbyterian, but in the absence of a church of his own denomination he was identified with the Congregational Church, which owes much to his generosity and magnanimity. Mr. Swan married Agnes Bell of Dumfries, Scotland, in 1856. She died January 19, 1907, the surviving children being William B., Miss M. Jessie and John Swan.

JOHN A. HURLEY, INC., Bridgeport, Conn., has just appointed Wiebusch and Hilger, 106 Lafayette street, New York, sole agents for the United States and all foreign countries. The house manufactures the Aladdin Tubular Lanterns and Quality Food Choppers.

The Retirement of Stephen Walkley.

STEPHEN WALKLEY, treasurer of the Peck, Stow & Wilcox Company, Southington, Conn., at the annual meeting of the company, in July last, declined a re-election to the responsible position he has held for so long a period, owing to impaired health. He is now seventy-six years old. Mr. Walkley is a native of Southington, where are located the general offices of the company and some of its factories. His father, Jonathan Walkley, was one of the substantial and influential residents of the town for many years. Although not an attorney, Jonathan Walkley was really a counsellor-at-law for the citizens, and no important action was taken without his approval. He was a scholar and a mathematician of remarkable ability. His daughter married Orson W. Stow, one of the founders of the Peck, Stow & Wilcox Company, and known throughout the metal trade as an inventor of many standard and important metal working machines. Mr. Stow served the company for years as director and vice-president until his death.

The youngest son, Stephen, the subject of this sketch, inherited his father's ability and ably filled numerous important positions in the towns where he lived. He enlisted in the army during the Civil War, and was private secretary to Gen. Joseph R. Hawley, who was perhaps best known as Governor, Congressman and United States Senator. Mr. Walkley has been connected with the army organization since that time, and is the author of the "History of the Connecticut Volunteers." He has always been greatly interested in educational work, is



STEPHEN WALKLEY.

a pillar in the Congregational Church, and possesses the confidence of all classes of the community.

At the organization of the Peck, Stow & Wilcox Company November 1, 1870, he was elected secretary, which position he held until 1874, when, owing to ill health, he resigned. He then bought the Southington *Phœnix*, a local weekly newspaper, which he edited for approximately a year. Regaining his health he sold his interest in the *Phœnix* about a year later, having been elected treasurer of the Peck, Stow & Wilcox Company, which trust he ably discharged until his retirement as above noted, at which time highly complimentary resolutions were adopted by the company's officials. His son, Edwin N. Walkley, was unanimously elected treasurer to fill the vacancy.

Mr. Walkley's personal influence has always been for good, and he has been active in the school and educational interests of the community. In the evening of a long life well spent he is collating a history of the Walkley family, tracing it back to the English progenitors.

AIR SHIP IN WINDOW DISPLAY.

A. M. BELL & CO., 131-133 Granville street, Halifax, N. S., supplemented a window display of House Cleaning Requisites by an air ship, which floated around above the display, traveling about 35 ft. every two minutes. The air ship had a car attached in which there were Dolls, representing men. The balloon and car were decorated with flags, upon which were printed local hits on topics discussed by the City Council and Board of Trade; also flags having on them advertisements of Fishing Tackle, &c.

The balloon and car were suspended by No. 36 Wire, fastened to a truck, running on a single wire track, and propelled by an endless belt of wire, running over wooden pulleys, the pulley at the small end of the frame being connected with a cord belt carried down to a small water wheel below the window. The framework and

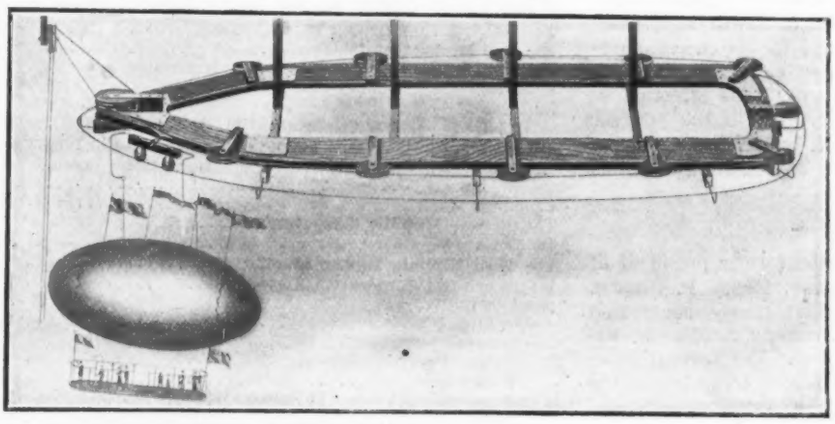


Fig. 1.—Air Ship in Window Display.

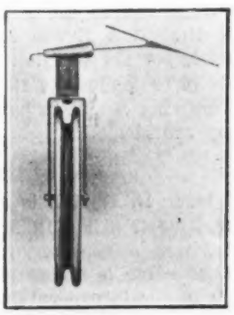


Fig. 3.—End View of the Arrangement of Propelling Wire and Truck.

pulleys were hidden from view by a sky of white paper, painted to represent cloud effects, in which was a slot for the wires to pass in the movement of the air ship. The same result might be obtained by tacking bunting around the outside of the track.

Fig. 1 shows the construction of the frame, the manner in which the airship was suspended and the application of power. The frame was 12 ft. long and 3 ft. 9 in. wide, suspended from the ceiling by four supports made of ½ x 1¼ in. stuff, and the corners were braced by pieces of ½-in. wood. The pulleys revolved in pieces of wood which were screwed to the frame. The pulley

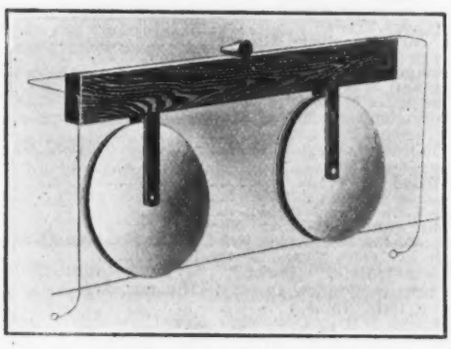


Fig. 2.—Truck from Which Ship Was Suspended.

at the pointed end of the frame was 5 in. in diameter, ⅝ in. thick, and had two grooves, one accommodating the track belt and the other one the power belt. The other pulleys were 3½ in. in diameter by ⅝ in. thick. All pulleys were of wood, with brass tube bushing. The track was made of No. 8 iron wire, which was soldered to wire supports, the other ends of which were fastened in the ends of wooden blocks screwed to the frame. The track stood off from the pulleys 1¾ in. and was 3 in. below the pulleys. The truck from which the ship was suspended had two wheels, as in Fig. 2, which were swiveled so as to pass around the corners.

Across the top of the truck frame a funnel shaped tube was fastened, with the small end pointing away from the frame, as shown in Figs. 2 and 3. A piece of wire was soldered, with the aid of a tin bracket, to and at right angles to the propelling wire belt, the free end of this wire passing through the funnel shaped tube, and the end of the wire was bent to prevent it slipping out of the funnel. This arrangement is shown in Fig. 3. When the propelling wire belt was in motion, the wire working in the funnel drew the truck, with the ship attached, around the track. The motor cord belt was carried from the small end of the frame horizontally to a vertical pulley in the corner of the window, thence to the window bottom and through to the water wheel below the window. If more convenient, power may be obtained from an ordinary electric ventilating fan, reducing revolutions to about three and one-half per minute, with connections from a 16 candlepower incandescent light.

The house cleaning requisites display shown in connection with the air ship was tastefully arranged and included Washboards, Carpet Sweepers, Washtubs, Varnish, Kalsomine, Wall Varnish, Scrub, and Stove Brushes, Paint and Varnish Stain, Color Cards, Cans of Mixed Paint, Pastry Boards, Furniture Polish, Tacks, and other articles necessary for up to date house cleaning.

New Britain Notes.

AT the meeting of the directors of the various constituent companies and also of the American Hardware Corporation, held on Saturday last, Howard S. Hart resigned as president and director of the Russell & Erwin Mfg. Company, as director of the Corbin Screw Corporation, and as second vice-president and director of the American Hardware Corporation. He thus severs connection with the American Hardware Corporation except with the Corbin Motor Vehicle Corporation. B. A. Hawley succeeds Mr. Hart as president of the Russell & Erwin Mfg. Company, and I. D. Russell was made first vice-president. The vacancy on the Board of Directors of the Corbin Screw Corporation was not filled. C. H. Parsons was elected second vice-president of the American Hardware Corporation, and the vacancy on the Board of Directors was not filled. At the same time William J. Surre resigned as secretary and director of the Corbin Screw Corporation, and the vacancies were filled by the election of George P. Spear.

CHARLES H. PARSONS.

Charles H. Parsons started his business career as traveling salesman for Landers, Frary & Clark of New Britain. He entered the employ of P. & F. Corbin, of which company he is at the present time the official head, in 1873, acting as a traveling salesman in New England and Canada. Since that time his duties have been gradually enlarged and his official responsibilities increased by successive promotions to second vice-president, first vice-president and, about a year ago, president of P. & F. Corbin, one of the largest, if not the largest, manufacturers of Builders' Hardware in the world.

Mr. Parsons' duties at the factory have always been arduous and yet he finds time at intervals to visit the

connections of his company, and thus maintains a personal acquaintance with the company's principal customers, and fully understands their needs. In fact, there are few men connected with the Hardware manufacturing interests of the country who are so well known. He has a keen, forceful mind, always quick to decide upon a course of action, and is an untiring worker who generally accomplishes any task to which he has set his hands. Mr. Parsons represents the highest type of New England character and his elevation to the important position of second vice-president of the American Hardware Corporation reflects the confidence of his associates.

BENJAMIN A. HAWLEY.

Benjamin A. Hawley, the newly elected president of the Russell & Erwin Mfg. Company, started in as a boy of 15 years in the New York warehouse. Gradually, by force of character and industry, Mr. Hawley worked himself up until he had charge of the important sales end of this warehouse. Always a hustler on the road, the army of customers of the Russell & Erwin Mfg. Company testify to his marked ability, to his cheerful disposition and to his honest, earnest efforts to build up the Russell & Erwin Mfg. Company. His selection to this important position is an incentive to the younger men in the employ of the Russell & Erwin Mfg. Company to untiring efforts in behalf of the organization of which they are members.

ISAAC D. RUSSELL.

Isaac D. Russell is a son of the former president of the Russell & Erwin Mfg. Company, Henry E. Russell, who was a nephew of the original Henry E. Russell whose name is associated with that of Cornelius B. Erwin in the incorporation of the firm. For several years he has occupied the important office of treasurer of the Russell & Erwin Mfg. Company and has been recognized as a keen, careful, conservative force in the counsel of the company. A graduate of Trinity College, Mr. Russell possesses more than an ordinary mind and his grasp of details is very large. It is said that there is no man in the Builders' Hardware business in America so well posted on costs and the tariff as he, and it is in recognition of his large experience and able judgment that he has been promoted to the vice-presidency of the company.

Wallingford Mfg. Company's New Catalogue.

THE WALLINGFORD MFG. COMPANY, Wallingford, Vt., John H. Graham & Co., 113 Chambers street, New York, selling agents, has just issued catalogue F, illustrating and describing its extensive line of Hand Farming and Garden Tools, including Forks, Rakes, Hoes, Grass Hooks, Corn Knives and Corn Hooks. The trademark Wallingford represents the company's highest grade, a second quality being labeled Green Mountain, while in a Manure Fork only it has a brand Climax, which is said to represent a good serviceable tool.

LOUIS H. SCHMITT, vice-president, secretary and general manager of the H. D. Smith & Co., Plantsville, Conn., manufacturing Vehicle and Special Drop Forgings and Drop Forged Fine Tools, has been chosen one of the Democratic Presidential electors in the State of Connecticut. Mr. Schmitt, a native of Charleston, S. C., began his business career as a youth in the New York office of the Peck Stow & Wilcox Company, from which some years ago he went to his present duties in Plantsville at the request of Lucius V. Walkley, who is virtually the owner of the H. D. Smith & Co.

THE ELLIS TOOL & SUPPLY COMPANY, 42 Church street, New Haven, Conn., has been organized under a Connecticut charter to carry on a factory and mill supply business, making a specialty of the Ellis Hacksaw and its own line of Screwdrivers. The company will also act as selling agent for the Slysir meat slicing machine. Edward L. Clarke, Jr., is president and secretary and Lloyd E. Jennings, treasurer.

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Hardware Organizations.

New York Retail Hardware Association.

It has been decided by the committee in charge as necessary and expedient to change the time for holding the annual convention and Hardware exhibition of the New York State Retail Hardware Association to February 16-19 next. As already announced, the convention will be held at Rochester. The headquarters of the association will be at the Hotel Seneca, and the different sessions of the convention will be held in the ball room of the hotel each afternoon at 2 o'clock. The Hardware exhibition will be given in the Convention Hall.

Iowa Retail Hardware Association.

The Iowa Retail Hardware Association, A. R. Sale, Mason City, secretary, has issued a prospectus in regard to the official gazette which will be issued shortly after the eleventh annual convention of the association, which will be held at Des Moines, February 9 to 12 next. The prospectus presents a sample page of the 1908 gazette, giving an idea of the makeup and paper to be used in the 1909 publication. The 1908 gazette contained 49 pages devoted to the proceedings of the tenth annual convention, 27 pages of general advertising, 21 pages of illustrations and six pages of association announcements. The desire is to make the gazette an association manual that will be read and kept as a valuable document in the library of the Hardware merchant; 2500 copies of the gazette will be distributed, the mailing list including every Hardware firm in Iowa. A schedule of advertising rates and order blank are also included in the prospectus.

Alabama Retail Hardware Association.

L. G. Smith, Ensley, secretary of the Alabama Retail Hardware Association, has issued an effective circular to the merchants of the State, under date September 25, from which we give the following extract, which appears under the heading, "Are You a Member?":

> Our association, to accomplish the greatest good for the greatest number, must be numerically as well as intellectually strong. Will you not give us a portion of your time and influence so that we may in turn be of greater assistance to you?
>
> Possibly you may think that we can't assist you in making your profits larger; BUT WE CAN.
>
> Possibly you may think that we can't keep the jobber from selling your customer at wholesale prices; BUT WE CAN.
>
> Possibly you may think that we can't be of assistance to you in collecting your accounts; BUT WE CAN.
>
> Possibly you may think that we can't help you conduct your business on more modern principles; BUT WE CAN.
>
> Possibly you may think that we can't save you from 25 to 50 per cent. on your insurance; BUT WE CAN.
>
> Possibly you may think that we can't be of assistance to you in a hundred other ways; BUT WE CAN.

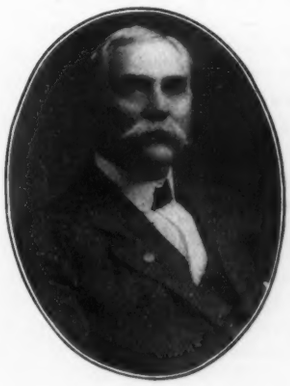
It is stated that the association is growing, which is accepted as indicating that the Hardware merchants of Alabama are not slow to avail themselves of the opportunity to become identified with a progressive organization which has for its object the elevation of their business.

Connecticut Hardware Association.

Taking the place of the usual summer outing, the members of the Connecticut Hardware Association, Jas. De F. Phelps, Windsor Locks, secretary, will attend the Danbury Fair at Danbury, Conn., on Wednesday next, 7th inst. This is done at the invitation of the Danbury Business Men's Association. The fair lasts from Oct. 5-10 and the 7th has been christened Business Men's Day, and a large attendance of representatives of business organizations in all parts of the State is looked for.

Tennessee Retail Hardware Association.

During the 10 or 11 months before the next annual meeting of the Tennessee Retail Hardware Association a determined effort will be made to interest the Hardware merchants of the State in the organization and secure the membership of a considerable proportion of them. At the first annual meeting held in August the secretary, M. Richardson, Lawrenceburg, reported a membership of but 19 firms, showing an increase of nine as compared with the number enrolled in the association at its formation 12 months previously. As a result of accessions during the meeting and since, the roll now numbers 30



JOHN D. DOBBINS.

M. A. WALKER.

houses, including many of the most enterprising and progressive retail concerns in the State, as follows:

Mitchell-Ashley Hardware Co., Columbia.
J. P. Street & Co., Columbia.
B. A. Satterfield & Co., Columbia.
W. D. Acuff & Co., Rockwood.
D. C. Taylor & Co., Trenton.
Jarrett & Love, Nashville.
Collins Hardware Co., Winchester.
Sprague Co., Winchester.
Fischesser & Son, Spring City.
E. P. Churchwell & Son, Savannah.
Wm. Tucker & Co., Ripley.
J. H. Johnson & Son, Jackson.
Keith, Simmons & Co., Nashville.
W. A. Hutton & Co., Gallatin.
C. H. Byrn, Murfreesboro.
Ewing Brothers & Co., Gallatin.
M. A. Walker, Covington.
M. Richardson & Co., Lawrenceburg.
Ellett-Harlan-Porter Co., Columbia.
Hager Brothers, Hartsville.
Warner & Shelby, Memphis.
Cowan, Hobbs & Dale Co., Fayetteville.
Mt. Pleasant Hardware & Furniture Co., Mt. Pleasant.
Dobbins & Ewing, Columbia.
Clayton Hardware Co., Lewisburg.
Newbern Hardware Co., Newbern.
Robinson & McGill Co., Shelbyville.
W. T. Marshall Hardware Co., Lebanon.
J. F. Parker & Son, Martin.
Freemon & Co., Lebanon.

M. RICHARDSON.

With the hearty co-operation of officers and members in bringing the association and its aims to the attention of their nonaffiliated brethren throughout the State, it is confidently hoped that by the time of the next annual gathering a very creditable percentage of the Tennessee retailers of Hardware will have allied themselves with the organization.

The officers of the association are: John D. Dobbins, Columbia, president; W. V. Hagar, Hartsville, vice-president; Fred J. Warner, Memphis, second vice-president, and M. Richardson, Lawrenceburg, secretary-treasurer. In accordance with the suggestion of Mr. Richardson in his annual report, read at the last meeting, a Grievance Committee was appointed to act in conjunction with the secretary in adjusting complaints made by members of objectionable practices on the part of jobbers and manufacturers. This committee consists of Messrs. Dobbins and Hager and Major M. A. Walker, Covington.

Besides the regular members, as above given, a number of well-known traveling salesmen are affiliated as honorary members. These include H. M. Owsley, Norvell-Shapleigh Hardware Company, St. Louis, Mo.; Walter Clark, Phillips & Buttorff Mfg. Company, Nashville; W. W. Porter, Peters Cartridge Company, Nashville; W. S. Shacklett, Fulton, Ky.; C. R. Echols, Simmons Hardware Company, Chattanooga; Fred. L. Martin, Gray & Dudley Hardware Company, Nashville; S. D. Briton, Pittsburgh Corrugating Company, McMinnville; J. L. Richardson, Norvell-Shapleigh Hardware Company, Covington, Tenn.

Here and There in the Hardware Store.

BY SAMUEL MASTERS.

II.—GETTING OUT OF A RUT.

DID you ever "get sore on your job"? Did you ever occupy a position at one side of the regular routes for promotion and find every avenue for advancement seemingly closed to you because every vacancy was claimed by some one who was next in line—who had had the hope of some day occupying it held out to him as an incentive for well doing? Did you ever work feverishly at the duties assigned you in an effort to prove your ability to do greater things, and by helping everywhere try to break in somewhere, or to create a new position in which you could make yourself valuable? Did you ever succeed in a measure having your salary finally advanced to just a little more than a clerk and a little less than a department manager, so that the medium priced places were beneath you and the few positions of trust unattainable? Did you ever strive unavailingly to get ahead in such an environment until the kindness of your employers seemed meanness, and the friendliness of your fellows offensive patronage? If you have, you have suffered, indeed. I have been there, and know.

The Light That Failed.

When I went to work for Hartman Bros., it was to establish and manage a new Sporting Goods department. My former employers, located in the Northwest, had had a good business in this line, and I had come down into the Middle States with an idea that I could form in my new connection such a department as I had left. But the territory wouldn't support it, and it finally amounted to little more than a modest display in the corner of the city store, and sample lines in the hands of two travelers on the routes furthest West, whose orders for Fishing Tackle, Ammunition, Loading Tools and a few cheap Guns, were shipped direct from the factories. Every effort to expand proved fruitless, until, finally, I gave up trying and endeavored to add something else to my repertoire of whatever nature possible.

Hartman, Sr., tolerated me as a protege of his brother, but firmly declined to "send good money after bad," and would not even consider arguments in favor of adding Bicycles, Hammocks, Tents, Kennel Goods, or anything else to my line. Hartman, Jr., as I can now see, really liked me, and would have done more to help me than he did if circumstances had permitted. As it was, it became his practice to turn over to me various problems which presented themselves for solution, outside the beaten paths, and I finally became as well known as "Junior's trouble man" as the "Sporting Goods man." Among other incidental duties, it finally fell to my lot to write the semiweekly newspaper advertisements for the retail store—the outgrowth of a series of ads. written to swell the holiday trade in my own line.

A Personal Sales Policy.

About this time an inquiry was made as to why the firm was not getting a satisfactory trade in its city store, and particularly in the factory supply department. Ironville is noted for the extent and diversity of its manufactures of articles of metal, and is located at such a distance from the cities that make factory supplies and from other trade centers, that the local dealers control the business. There were three of them, with a small Belting manufacture as a poor fourth. Hartman Bros. had at one time handled the bulk of the business, but in the last year or two the sales had dwindled until it was very evident that something was amiss. Charles Martin, the city manager, blamed the credit man—said it was useless to go after orders and have them turned down when taken—that so soon as he went outside the firm's present regular customers the orders were refused. He had two city salesmen, whose time was ostensibly devoted to the pursuit of orders, but Mr. Martin claimed that better prices and a bigger business could be secured by working a friendly game with the factory buyers. The men were accordingly instructed to toll the buyers into the store, where the manager could take them in hand, or supervise the making of prices, so they lunched and played pool (at Hartman Bros.' expense) with such buyers as they could induce to join them, and brought them in to see Mr. Martin when there was business in sight and they could be induced to come. A strictly competitive business was, according to Mr. Martin's instructions, carefully avoided as yielding lessened profits.

A Chance for Me.

But the receipts dwindled month by month, and it was increasingly evident that City Manager Martin's schemes were not winning ones. Buyers got wary of coming in to pay the top of the market prices. Hartman, Jr., bullied Mr. Martin. but couldn't disprove his theories. He pleaded with the credit man to "loosen up," but that worthy person proved that every order refused was declined for good reasons. Mr. Martin told me of Hartman, Jr.'s, "injustice," and the next time that Junior came into my corner on a visit of inspection, I told him that I knew of the trouble in the city store, and that I should like to try to make matters straight.

"I don't believe you can do anything, Sam," he said, "Martin will insist on dancing in a pint pot, and isn't to be reasoned with. You would have to do as he told you, so long as he is manager, and you couldn't run the store in his stead."

"I shouldn't want to," I replied. "I think if it is managed right, Mr. Martin will ask me to help him, and if I am working under him, I can make suggestions and work out new plans under his direction that will bring in business. I feel sure that Mr. Martin is worried. You know I am now writing his ads., and perhaps that fact could be used as a wedge to get me in there."

A Basis for Action.

Hartman said "He'd see" and left, but he came back later in the day and told me that he wanted me to go into the city store, ostensibly to work under Mr. Martin, but really to execute his (Junior's) orders; that I'd have to work craftily and without friction, for if Mr. Martin made any complaint Hartman, Sr., would discharge me as a means of ending the trouble. Since the morning visit my brain had been busy formulating a plan for trade getting, and I had written it out for his inspection. A carbon copy lies before me now. It was based upon what business experience I possessed, what I knew of the weaknesses of Mr. Martin's plan of action, and what I judged would please Hartman, Jr. He read it through carefully; reread certain paragraphs and drew his pencil across one of them.

"That is all right, Sam," said he, "that is just about what I want done, but Martin would never consent to it, if put up to him in this way, and my brother would support him in a pinch."

"Suppose," said I, "that only one step at a time be taken up with Mr. Martin, and that if possible he be induced to suggest it to you. If he can be made to father a scheme, he will do all he can to make it a success, and if it makes for more business, as I am sure it will, he will be only too glad to push it hard."

"Well," said he, "the first thing to do is to get you down there. I suppose we can do that best through this advertising."

Light Ahead.

Then he left me to go down into his office. I could hardly contain my pleasure over the prospect. At last I was to have a chance to really accomplish something that would advance me with the firm. The dead wall had opened. I never doubted for a moment that Hartman, Junior, would not get me into the city store, nor that Mr. Martin would not let me work out my plans for an enlarged business. I do not believe a man released from a prison ever felt more pleasure in the sight of the blue sky and the breathing of the pure air than I experienced in this prospect of freedom from the hampering limitations of my old work, and a definite prospect of securing advancement as a reward of effort.

(To be continued.)

HARDWARE FREIGHTS.

Railroad Claim Blank.

EFFECTIVE methods of handling damage claims against railroads for freight lost or injured in transit are of great interest to the trade. Both wholesale and retail merchants have many such claims to make in the course of a year, and the latter, since they usually maintain but a small office force, are especially in need of some simple but sure and comprehensive system for filing and following up their claims. Very often a claim is filed and then forgotten and lost sight of and the railroad company is not likely to be the first to take it up. Frequently, too, in making claims by letter, merchants will leave out some important details which will cause unnecessary trouble and delay an adjustment.

Having experienced these difficulties, Granby Hardware & Implement Company, Granby, Mo., has evolved a method which, since its adoption, has enabled the company to handle and collect damage claims with much success. A railroad claim blank is used, as shown in the accompanying illustration. This is about 8 x 10 in. in size and is designed to cover every important detail, and after using it more than a year no reason has been found to change it. The blanks are arranged in duplicate with alternating white and yellow sheets and are bound in book form, so that a correct record of all claims will be kept in one place, where it cannot be lost sight of. The original white blank is perforated so that it can be torn out and sent to the railroad company. In making claims it has also been found important to send the railroad companies a duplicate or certified copy of invoice, bill of lading and expense bill; all other data are shown on the blank form, as illustrated.

W. W. SCHOLES, Manager. TELEPHONE 25

Wagons, Buggies, Plows, Cultivators, Points and Oils

Granby Hardware & Implement Co.
LEADERS OF LOW PRICES

Powder, Fuse, Caps, Shovels, Wire, Rope, Drill Cable, Iron and Steel.

GRANBY, MO.,

CLAIM FOR Goods broken in transit
Frisco RAILROAD COMPANY

OUR NUMBER 128
YOUR NUMBER 137467
DATE OF CLAIM Dec 17-1907

DR. To **Granby Hardware & Implement Co.**
Granby, Mo.

		Amount of Claim	Amount Paid	Date Paid
On Shipment Washing Machines	Weight			
From St Louis Mo	Should Be			
To Granby Mo	Excess Weight			
B/L Dated Dec 12-1907	Rate Charged			
Consignee Us	Should Be			
Invoice Dated Dec 12-1907	Excess Rate			
Consignor Lamme Hair Co	Damaged How			
Way-Bill No. 1273	Articles			
Way-Bill Date Dec 12-1907	Broken wheel	75		
Car Number 12348	Express on	35		
Car Initial AT&SF	repair part	1 10	1 10	Jan 10-1908
Expense Bill No. 274				
E/B Date Dec 16-1907				

REMARKS: Copy of invoice, Bill of Lading and Expense bill filed.

Yours Truly,
GRANBY HARDWARE & IMPLEMENT CO.
BY W W Scholes Manager.

Claim Blank Referring to Damaged Freight Shipment.

What is the Result?

The consignee, being unable to check up his invoice, deducts the amount of shortage from his remittance. The bookkeeper then writes for an explanation and is informed certain goods are checked short.

The matter is then placed in the hands of the Claim Department, which writes for further particulars and asks for the freight bill covering, upon receipt of which claim is made against the railroad company in behalf of the consignee.

In due time the papers are returned to claimant with letter stating, "Upon investigation we find we hold clear receipt, and claim is respectfully declined." Then follow a long drawn out controversy and a final adjustment, which is usually unsatisfactory to one or the other party.

Importance of Receipting Only for Goods Received.

Shippers as a rule are ever ready and willing to assist customers in recovering any loss sustained at the hands of the railroad companies, but it should be borne in mind:

1. That a clear receipt from the railroad company to the party making the shipment releases the shipper in full from any responsibility for the delivery of the goods.

2. That if the consignee has given a clear receipt to the railroad company before a full delivery of the goods has been effected, the railroad company is thereby placed in position to claim full delivery and decline to entertain the claim.

All parties receiving shipments can therefore see the great importance of being sure that only such goods as are received are receipted for. MINNESOTA.

SEPTEMBER 21, 1908.

Receipts for Shipments Given too Freely

To the Editor: We have read your articles on "Hardware Freights" and note the many good things contained therein. The articles can be made very instructive to the shippers as well as the receivers of freight, as much can be done to make it easier for both.

It occurs to us at this time the matter of giving receipts for shipments should bear some consideration.

We believe receipts are given too freely, especially by authorized draymen. It is the common practice with railroad agents at all stations (large or small) to take receipts for goods at the time the freight bill is taken up in exchange for their receipt for freight charges. The exchange usually takes place at the cashier's or agent's window before the party signing the receipt knows whether the shipment has arrived or not or what condition the packages are in.

Notation Should Be Made on Freight Bills

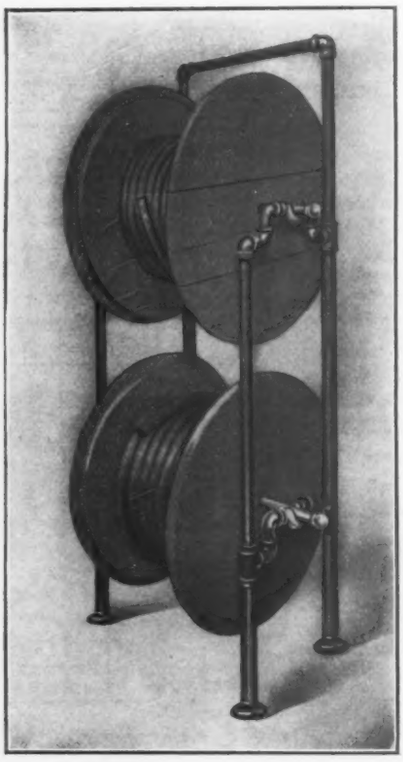
The receipt remains in the agent's office, and if a shortage is discovered by the drayman he is invariably told the missing goods will arrive on the next train. The drayman should then insist on a notation being made on his freight bill and a corresponding notation on the receipt he has signed.

It is next to an impossibility to get an agent to make a notation of shortage or damage on a freight bill, and with a promise that the shortage will soon show up, or if a claim is presented for damage it will be paid, as he has a record of the shipment in his file, the matter is dropped.

The Hardware stock of Hill Hardware company, Columbia, Miss., wholesale and retail, has recently been severely damaged by fire.

A Lead Pipe Reel Rack.

THE accompanying illustration shows a lead pipe reel rack used in the store of the Oswego Hardware Company, Oswego, N. Y., and originated by Frank J. Rowlingson, stock keeper for the company. The length of each of the four 1¼-in. upright pipes to the first malleable tees is 1 ft. 3 in. These are secured at the lower ends by 1¼-in. malleable floor plates. The 1-in. upright pipes extending from the first to the second axle supports are 2 ft. 8 in. long, R. & L. thread. At the top of the front pipe, on each side of the rack, is a 1-in. R. & L. elbow and opposite, on each of the back pipes, is a 1¼-in. malleable tee. The axle supports are made (commencing at each upright and extending to the axle) of 1-in. malleable elbows, 1 x ¾ in., bushings ¾ in., close nipples and ¾ in. cross over. The axles are ¾-in. pipe, each 3 ft. long, with lock nuts near the extremities and ¾-in. malleable caps on each end. The 1-in. upright pipes above the upper axle bearing are 1 ft. 8 in. long, on the top of which are 1-in. malleable elbows, connected by 1-in. pipe, 1 ft. 10 in. long, with R. & L. threads.



A Lead Pipe Reel Rack.

Reed Mfg. Company.

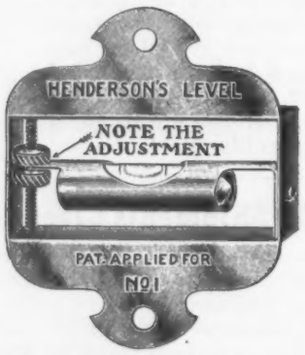
The Reed Mfg. Company, Kalamazoo, Mich., is making castings for automobile and other machinery manufacturers, also for dies and other purposes, requiring an extremely high carbon casting for tempering. This special mixture is also used for a line of hammers, hatchets, &c., the tools being cast in molds, then tempered and finished.

Elmore Tool Mfg. Company.

The Elmore Tool Mfg. Company, Hartford, Conn., which has lately been reorganized and the plant removed from Southington, is placing on the market a line of small tools of patented construction, especially in the way of screw drivers. The latter are made practically indestructible, the blade being forged from one solid piece of steel extending the entire length of the handle with round countersunk head. The knurling of the shank directly under the head does away with the different styles of lugs and wings generally used. These screw drivers are made in many different styles and sizes, such as electricians', cabinet makers', piano makers', machinists', &c. In addition to a complete line of these tools the company is also manufacturing nail sets, screw driver bits, center and prick punches, cold chisels, nail pullers, pry and pinch bars, ice picks, scratch awls, gas pliers, wire cutters and pliers, shoemakers' hammers, combination hatchets, tack pullers, and many other similar tools. With the present manufacturing facilities the company expects within a short time to add further to its products. Although the Elmore tools have been manufactured for several years, it has been only in a small way, but with the equipment and capacity now possessed by the company it is intended to push their sale with increased enterprise and energy. A catalogue issued by the company contains illustrations of and list prices on many of the tools to which reference is made.

Henderson's Straight Edge Level.

A level which is designed more especially for carpenters, bricklayers and tile setters, and which is made of brass, nickel plated, has just been placed upon the market by Henderson & Co., 204 North Main street, Memphis, Tenn., and is illustrated herewith, two-thirds actual size. The frame of the level is so constructed that it forms a shield for the bulb to prevent its being broken by carelessly letting it fall. One end of the level is riveted to the frame, while the other is slotted, so as to fit neatly around a threaded rod upon which are two lock nuts. With this adjustment the free end of the bulb can be raised or lowered with great ease and accuracy, while the other end acts as a spring. No tools are necessary to apply the level, as two thumb screws with which to fasten the level to a straightedge accompany each level. It is pointed out that when the level has been applied and adjusted it cannot shift, as the thumb screws are cone shape, thus taking up all play and rendering it perfectly rigid. After the level has once been applied it can be removed and replaced as often as desired without having to adjust it again so long as the same straightedge is used. With one of these levels placed on a plumb rule it may be used for setting door jambs and window frames, plumbing up partitions, laying sleepers in fireproof buildings, grading off cement for tile floors, leveling joists, and doing many other things in a convenient and accurate manner. For leveling foundations it can be easily attached to a straightedge of any desired length, practically making the straightedge a perfect level and eliminating the necessity of having to carry two tools where one will serve the purpose. The level weighs less than 2 oz.



Henderson's Straightedge Level.

Colt .380 Automatic Pistol.

The Colt's Patent Firearms Mfg. Company, Hartford, Conn., has added to its line the automatic, caliber .380, hammerless pistol here illustrated. It is made to supply the demand for a weapon similar to the company's .32 automatic pistol, but of larger caliber, and is of the same weight, length and action as the smaller arm. The barrel is 3¾ in. long, the length over all 6¾ in., weight 23 oz., and .38 rimless smokeless cartridges are carried, the capacity of the magazine being seven shots. The pistol is full blued finish, with rubber stocks. Being flat and compact, it is especially recommended by the

maker for carrying in the pocket, where it may be conveyed without risk of accidental discharge because of the action safety, which prevents discharge until the action is entirely closed. The slide lock, which indicates when the pistol is cocked, when engaged in the slide cut, disconnects the trigger from the operating mechanism, but can be readily drawn down when about to shoot. As a third precaution the arm is equipped with an automatic safety, also acting as an indicator, which locks the action until the handle is firmly grasped when pulling the trigger. Another feature to which attention is called

Colt .380 Automatic Pistol.

is the absence of unpleasant kick, the recoil which causes the average shooter to flinch and impairs his aim is utilized in manipulating the action—that is, ejecting the empty shell, inserting a fresh cartridge, and leaving the weapon ready for the next shot. In commenting on the accuracy of the arm, the manufacturer instances that in the regular course of inspection 80 consecutive shots were fired from 10 different pistols at a distance of 45 ft. and the entire group was within a circle 2½ in. in diameter.

The Chicago Folding Sled.

Something of a novelty in sled construction is furnished by the Chicago Wire Chair Company, 129-131 La Salle avenue, Chicago, Ill., which is marketing the folding sled here illustrated. In providing the folding

Fig. 1.—The Chicago Folding Sled.

feature nothing has been sacrificed in the way of simplicity or lightness. The method of construction is clearly shown in Fig. 2, which presents a bottom view of the sled, with the runners folded back on the under side of the seat board. The runners are made of steel rods, which are clamped to the wooden top in a manner that permits them to be easily folded. When in upright position the legs are held by adjustable braces, the form

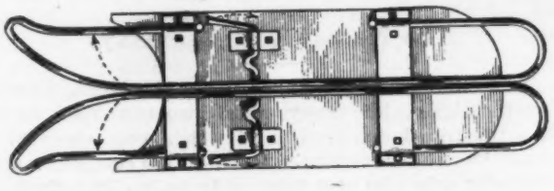


Fig 2.—Chicago Sled with Runners Folded.

of which is shown in Fig. 2. A notable feature of the design used in this construction is the clear opening between the runners, which offers no obstruction to the snow. All parts are securely bolted together with nickel plated bolts, and the top is attractively finished in bright colors, while the runners are painted white. When compactly folded the sled can be readily carried under one's arm, and because of its compactness can be shipped at a lower rate of freight than applies to set-up sleds.

Small Emery Wheel Grinders.

Two patterns of emery wheel grinders here illustrated are the product of the Stover Mfg. Company, Freeport, Ill. Fig. 1 represents a machine designed for light work and of such construction as to be safely operated by any one. It is built without gears and the driving wheel is provided with flange points on the rim to pre-

Fig. 1.—Emery Wheel Grinder No. 100.

vent the belt slipping off. A simple provision is also made for the tightening of the belt, and the tool rest is adjustable to the varying requirements of work. It is specially adapted for general use in the small shop, farm, store or home. This tool is designated as No. 100 and carries a wheel ½ x 4 in., with a speed of nine and one-half revolutions for each turn of driving wheel, and weighs 5 lb., net. The iron parts of the wheel are neatly japanned. Fig. 2 illustrates the No. 120 Stover grinder, which is of the geared type. Special care, it is stated, has been taken in the construction of this machine to make the gears mesh perfectly, thus insuring a minimum

Fig. 2.—Stover Geared Emery Wheel Grinder No. 120.

of noise and friction in its operation. The frame or base is made to be screwed down to the bench and the mounting of the two large wheels on the base just over the bench adds to its stability and steady motion. The power necessary for attaining the wheel speed required for effective work is provided for in the long sweep given to the handle. This machine also has an adjustable tool rest so arranged as to follow the wear of the wheel. All the iron parts of the tools are galvanized and it is built for heavy and constant service. It mounts a wheel 1 x 4 in. with a speed of 30 revolutions for each turn of handle, and weighs 7 lb., net.

The New Wells Pipe Cutters and Tool Sets.

The F. E. Wells & Son Company, Greenfield, Mass., has brought out an improved type of its pipe cutters, in which, apart from general design, a new feature is the nut through which the handle works, this being removable and replaceable at small expense if it should become

Fig. 1.—Roller Cutter.

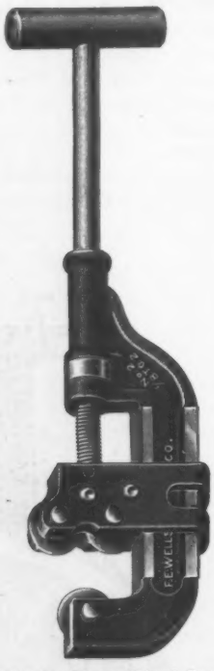


Fig. 2.—Three-Wheel Cutter.

The New Wells Pipe Cutters.

worn. The frame is of malleable iron instead of pressed steel. The wheels and rollers are held in place by hardened steel pins, and cotter pins are used to prevent the pins coming out or turning with the wheel, as may happen with the ordinary taper pointed pin. The wheels are of the standard Barnes type, and made from a specially selected steel, hardened and tempered. No. 1 shows the roller cutter, ordinarily used because the burr on the end of the pipe is rolled down, causing the dies to start more easily. The Wells type gives a wide range of work, the No. 1 cutting from ⅛ to 1¼ in. pipe, the No. 2 from

Fig. 3.—The New Wells Tool Sets.

⅛ to 2 in. and No. 3 from ½ to 3 in. Three-wheel pipe cutters, No. 2, are necessary where the pipe is next to the wall or in other place where the cutter cannot be revolved entirely around the pipe. With this type one-third of a revolution of the cutter will cut the pipe, leaving a burr as in other tools of the class. The sizes have the same capacity as the roller cutter kind. The company has also brought out new pipe tool sets, one of which is shown in Fig. 2. There are five different assortments for use in installing running water, gas, steam or hot water apparatus. Assortment A has the tools, including stocks and dies, pipe wrench, pipe cutter, vise, &c., to handle pipe from ¼ to 1 in., Assortment B covers pipe from ¼ to 1¼ in., Assortment C from ¼ to 1½ in., Assortment D from ¼ to 2 in. and Assortment E from ¼ to 2 in., with complete tools for plumbers' or steam fitters' kit.

The Durant Counter, Model B.

The W. N. Durant Company, Milwaukee, Wis., has added to its line the counter shown herewith. Because of its compactness in size and light weight this style of counter is applicable to many uses for which the company's ratchet counters are not. It is constructed entirely of sheet steel, excepting brass bearings and unit gear. It is of the full geared positive type and contains a single strong and durable spring for retaining the lever in position. This may be dispensed with where a positive attachment can be procured. The operating lever can be readily set at any of four different positions at either the right or left end of the counter. The movement is said to be free and the positive action allows of operation at a speed of over 400 strokes per minute without inaccuracy or breakage. Resetting is accomplished without the use of a key. If desired the lid may be fitted with a

The Durant Counter, Model B.

lock to prevent resetting. The case is finished in black enamel and is dustproof. The counter may be used on punch presses, printing presses, automatic scales, &c. There are a number of modifications of this same type of counter for special uses, among which is a star wheel counter, for use on conveyors or chutes; a rotary counter, for direct connection to machine shafts, winding lathes, rolls, &c., for counting revolutions, and also a lineal measure counter. The latter consists of a counter of the type of the model B, fitted with a measuring wheel, and an adjustable supporting bracket. The measuring wheel is strongly constructed of cast iron, with milled rim, and is 12 in. in circumference, thus making the counter register one for each foot traveled. The shaft is fitted with extra long bearings and with an adjustable friction brake to keep the wheel from spinning from its own momentum. It is pointed out that this machine is admirably adapted and easily applied to wood working machines, while it can also be used to great advantage for measuring paper, wire, rope, cloth, &c.

The Massey Vise Company.

The Massey Vise Company, 176-178 South Clinton street, Chicago, has lately added two new vises to its line, illustrated descriptions of which were given in a recent issue. Inadvertently, however, the company's new Lightning grip vise was referred to as No. 18 instead of No. 23, the correct designation. This vise is represented as different from other types, in that the parallel bars of the sliding jaw passing through widely spaced bearings on the stationary jaw are connected at their rear end by a carrier which engages on the outside guide of the stationary jaw on which the cam shaft is set. The vise is strengthened materially by the rear bearings, provided for the sliding bars and also has a positive lightning grip. The company's Clincher Coachmakers' vise was also illustrated, but as a result of a typographical error was alluded to as a coachmen's vise.

The Feel-Fine Air Heels.

The accompanying illustration represents a patented air heel worn inside the shoe to give comfort to the wearer when standing or walking. The heels are pneumatic cushions of high grade rubber, or rubber channels filled with air. The rubber outside the channels is stitched to thin sole leather, occupying very little space within the shoe, and conforming to the shape of individual heels. The leather part of the heels is to be placed uppermost in the shoe for direct contact with the person's feet. The maker states that the device reduces the tendency toward the running over of shoe heels. The heels are made in sizes to fit any individual by the Consolidated Mfg. Company, Hartford, Conn.

The Feel-Fine Air Heels.

Iver Johnson New Champion Shot Gun, Model 36.

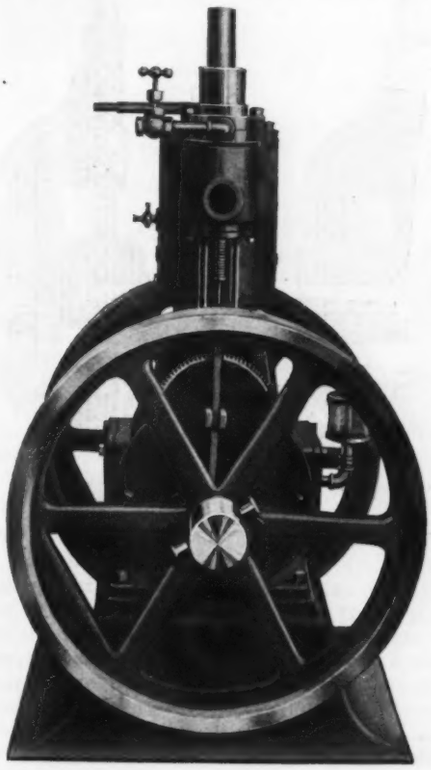
The Iver Johnson Arms & Cycle Works, Fitchburg, Mass., is manufacturing a new model single barrel shotgun, a view of which is presented herewith. It has many improved features, which the company claims make it one of the most superior shotguns on the market, irrespective of price. The most notable departure to which attention is called is the construction of the barrel and lug, which are forged in one, made from one piece of steel, upset and hammer forged, laying the fiber of the metal in all directions ready to receive either the longitudinal or transverse strain, and thus adding greatly to the strength and safety of the gun. It has an adjustable tension bar, which increases the power of the main spring as desired, and a pivoted compensating locking bolt to take up wear. By using a snap fore end the joint is left solid, keeping the frame from spreading and giving a strong support to the joint pin. The manufacturers state that every portion has been reinforced and the metal has been carefully distributed in the frame and other parts in proportion to the strain which must be withstood at all points. The great strength obtained in this way, as well as in the one-piece forged barrel and lug, make the gun suitable for Nitro powder without increasing the weight. The butt plate is of doubled thickness, giving absolute strength at this point, and it has also been corrugated to prevent slipping at the shoulder. The automatic ejector is shown in the illustration. Other details and features of excellence are referred to in the company's printed matter.

Iver Johnson Champion Shotgun, Model 36.

W. M. Tatum Hardware Company, Corsicana, Texas, has suffered a loss of $300 by fire in its warehouse. The company handles Shelf and Heavy Hardware, Stoves, Tinware and Sporting Goods.

Bovaird Gas and Gasoline Engines.

Bovaird & Co., Bradford, Pa., manufacturers of boilers, steam and gas engines, air and steam heads, pipe, tubing, &c., for oil, gas and artesian wells, have lately added to their line the vertical gas and gasoline engine, illustrated herewith, which is furnished in two sizes, 2 and 4 hp. The makers state that although the engines run at moderate speed, they are abundantly able to develop their rated horsepower under all circumstances. Therefore, there is no danger of their being racked by excessive speed in doing the work, and the foundations do not call for more than ordinary care. The machine is said to be remarkable for its few working parts, and has but two valves—inlet and exhaust. The governor is furnished regularly in the hit and miss type, although the throttling type can also be furnished,



Bovaird Vertical Gas and Gasoline Engine.

and has but two moving parts. Poppet type valves are used, which are easy to regrind should carbon or burnt oil accumulate on them. The bearings are of brass or prosphor bronze, and the gears are all machine cut. The engine is thoroughly water jacketed, and the crank is enclosed in a dust proof case, which forms a reservoir for oiling the crank brass and to aid in oiling the piston and cylinder. The cylinder and base are detachable, and every part of the engine is said to be easily accessible. An important feature referred to by the makers is the possibility of replacing parts. The base, frame, cylinder and head are all separate pieces, so that in case of accident it is not necessary to replace practically the entire machine.

The 1900 Electric Washing Machine.

The Nineteen Hundred Washer Company, Binghamton, N. Y., is manufacturing the washing machine here shown, operated by an electric motor. The supports on

The 1900 Electric Washing Machine.

which the tub rests are selected timber, bolted to an iron plate, above which and bolted to the same plate are the bottom boards to support the working parts, tub and wringer frames. The motor is placed below the bottom boards. It is said that the motor supplies more than enough power to work both the washer and wringer, and that two to four cents a week will pay for all the electric current needed to do a large washing. The current is obtained by connecting with the electric lighting fixtures in the house. The tub is made from Virginia white cedar, with dovetailed staves, bound with electrically welded wire hoops. To the pivot axis are fastened two heavy oil tempered coil steel springs. The springs are also fastened to plates at the ends of one of the bottom boards. In operation the tub swings part way around and then back. The power can be shifted in an instant from washer to wringer by the movement of a small lever.

Keck's Folding Table.

The top of the folding table shown herewith is made of basswood and is 22 x 48 in., large enough, it is remarked, for a woman to use in cutting a skirt. The legs

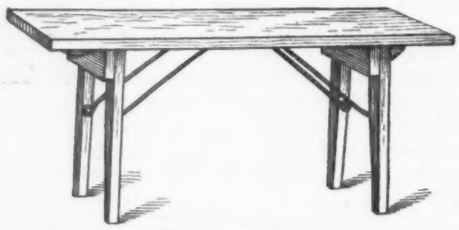


Fig. 1.—Keck's Folding Table.

are braced with coppered wire bails, which catch between a piece of corrugated metal and a spring on the inner side of the top. The bails are to hold the legs firmly against the cleats placed across either end of the top and make the table stand steadily. When set up the

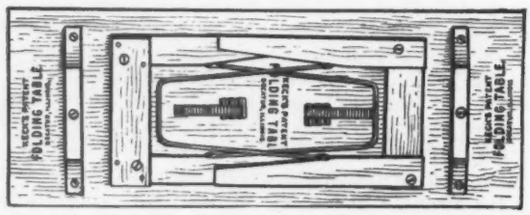


Fig. 2.—Keck's Table Folded.

table is 30 in. high. It folds so that it is about the thickness of two boards the size of the top laid flat together. It can easily be set out of the way in a closet behind hanging garments. The table is manufactured by John A. Keck Company, 208 West Wood street, Decatur, Ill.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—

	℔ gal.
Linseed, State and Western, raw	42 @44
City, Boiled	45 @46
City, Raw	44 @45
Raw, Calcutta, in bbls	70 @71
Lard, Prime, Winter	72 @75
Extra No. 1	50 @52
No. 1	48 @49
Cotton-seed, Crude, f.o.b. mill	28½@29
Summer Yellow, prime	38½@39½
Summer, White	43 @44
Yellow Winter	45 @47
Tallow, Acidless	58 @60
Menhaden, Brown, Strained	35 @36
Northern Crude	24 @..
Southern	24 @..
Light Strained	35 @36
Bleached Winter	37 @39
Ex. Bleached Winter	39 @41
Cocoanut, Ceylon	℔ lb 6¼@ 6½
Cochin	℔ lb 7¼@ 7½
Cod, Domestic, Prime	38 @40
Newfoundland	40 @42
Red, Elaine	40 @41
Saponified	℔ lb 5¾@ 6
Olive, Yellow	$0.90@$1.00
Neatsfoot, Prime	55 @58
Palm, Lagos	℔ lb 5¾@ 6

Mineral Oils—

	℔ gal.
Black, 29 gravity, 25@30 cold test	13 @13½
29 gravity, 15 cold test	13½@14
Summer	12½@13
Cylinder, light filtered	20½@21
Dark, filtered	18 @19
Paraffine, 903-907 sp. gravity	14½@15
903 sp. gravity	13½@14
883 sp. gravity	11 @11½
Red	13½@14

Miscellaneous—

Barytes:	
White, Foreign	℔ ton $18.50@20.50
Amer., floated	℔ ton 17.00@18.00
Off color	℔ ton 12.50@15.00
Chalk, in bulk	℔ ton 3.00@ 3.40
China Clay, Imported	℔ ton 11.50@18.00
Cobalt, Oxide	℔ 100 lb 1.45@ 2.60
Whiting, Commercial	℔ 100 lb 42@52
Gilders	℔ 100 lb .55@ .60
Ex. Gilders	℔ 100 lb .60@ .65

Putty, Commercial—℔ 100 lb

In bladders	$1.70 @1.80
In bbls. or tubs	1.20 @1.45
In 1 lb to 5 lb cans	2.65 @2.95
In 12½ to 50 lb cans	1.50 @1.90

Spirits Turpentine—℔ gal.

In Oil bbls.	38½@39
In machine bbls.	39 @39½

Glue—

	℔ lb
Cabinet	12 @15
Common Bone	7½@ 9
Extra White	18 @24
Fish, liquid, 50 gal. bbls., per gallon	.60 @1.20
Foot Stock, White	12 @14
Foot Stock, Brown	9 @11
German Common Hide	10 @12
German Hide	12 @18
French	10 @40
Irish	13 @16
Low Grade	10 @12
Medium White	14 @17

Gum Shellac—

	℔ lb
Bleached, Commercial	23 @24
Bone Dry	28 @29
Button	30 @40
Diamond I	@37
Fine, Orange	34 @35
A. C. Garnet	27 @28
G. A. L.	20 @21
Kala Button	18 @19
D. C.	@38
Octagon B	35 @36
T. N.	25 @26
V. S. O.	@37

Colors in Oil—

	℔ lb
Black, Lampblack	12 @14
Blue, Chinese	36 @45
Blue, Prussian	32 @36
Blue, Ultramarine	13 @16
Brown, Vandyke	11 @14
Green, Chrome	12 @16
Green, Paris	@24
Sienna, Raw	12 @15
Sienna, Burnt	12 @15
Umber, Raw	11 @14
Umber, Burnt	11 @14

White and Red, Lead &c.—

	℔ lb
Lead, English white, in Oil	10¼@10¾
Lead, American White:	
Dry and in Oil, 100, 200 and 500 lb kegs	7
Dry and in Oil, 25 and 50 lb kegs	7¼
Dry and in Oil, 12½ lb kegs	7½
In Oil, 25 lb tin pails	7½
In Oil, 12½ lb tin pails	8
In Oil, 1, 2, 3 and 5 lb tin cans, ass't	9
Red Lead and Litharge:	
In 100 lb kegs	7
In 25 and 50 lb kegs	7¼
In 12½ lb kegs	7½
In lots of less than 500 lbs, ½¢ ℔ advance over above prices of White and Red Lead and Litharge.	

Lead, American. Terms: On lots of 500 lbs and over, 60 days, or 2% for cash if paid in 15 days from date of invoice.

Zinc, Dry—

	℔ lb
American, dry	5½@ 5¾
Red Seal (French process)	6¾@ 7
Green Seal	7¼@ 7½
German Red Seal (French process)	6¾@ 7
Green Seal	7¼@ 7¾
White Seal	7½@ 8¼
French, Red Seal	8¾@ 8¾
Green Seal	10¾@10¾

Dry Colors—

	℔ lb
Black, Carbon	6½@10
Black Drop, American	3½@ 5
Black Drop, English	5 @15
Black, Ivory	16 @20
Lamp, commercial	4 @ 6
Blue, Celestial	4 @ 6
Blue, Chinese	31 @33
Blue, Prussian	29 @31
Blue, Ultramarine	3½@15
Brown, Spanish	½@ 1
Carmine, No. 40	$3.10@3.25
Green, Chrome, ordinary	3½@ 5
Green, Chrome, pure	17 @25
Ocher, American	℔ ton $8.50@16.00
American Golden	2½@ 3¼
French	1¼@ 2
Foreign Golden	3 @ 4
Orange Mineral, English	10 @12
French	12¾@13
German	12 @13
American	9 @10
Red, Indian, English	4½@ 6
American	3 @ 3¼
Red, Turkey, English	4 @10
Red, Tuscan, English	7 @10
Red, Venetian, Amer.	℔ 100 lb $0.50@1.25
English	℔ 100 lb $1.15@1.60
Sienna, Italian, Burnt and Powdered	3 @ 9
Italian, Raw, Powdered	3 @ 7
American, Raw	1½@ 2
American Burnt and Pow'd.	1½@ 2
Talc, French	℔ ton $18.00@25.00
American	℔ ton 15.00@25.00
Terra Alba, French.	℔ 100 lb .90@ 1.00
English	℔ 100 lb .80@ 1.00
American	℔ 100 lb, No. 1 .75@ .80
American	℔ 100 lb, No. 2 .60@ .65
Umber, T'key, Bnt, & Pow.	2¾@ 3
Turkey, Raw and Powdered	2¾@ 3
Burnt, American	1½@ 2
Raw, American	1½@ 2
Yellow, Chrome, Pure	13¾@15
Vermilion, American Lead	7 @25
Quicksilver, bulk	65 @..
Quicksilver, bags	@66
English, Imported	65 @70
Chinese	$0.90@1.00

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1907, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—"The Iron Age Standard Hardware Lists" contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—
Columbian and Domestic.....33⅓%
North's 10%
Upson's Patent, ℔ gro., $29.90.....10%
Zimmerman's—See Fasteners, Blind.

Window Stop—
Ives' Patent.....35%
Ives' Stop Bead Screws and Washers 10%
Taplin's Perfection.....35%

Ammunition—See *Caps, Cartridges, Shells, &c.*

Anti-Rattlers—
Fernald Mfg. Co, Burton Anti-Rattlers, ℔ doz. pairs, Nos. 1, $0.75; 2, $0.60; 4, $1.00; 5, $0.50.
Fernald Quick Shifter, ℔ doz. pairs .....$2.00@$3.00

Anvils—American—
Eagle Anvils.....℔ lb @8 ¢
Hay-Budden, Wrought.....9½@9¾ ¢
Trenton .....℔ lb 9½@9¾ ¢

Imported—
Swedish Solid Steel Sisco, Superior, ℔ lb.....10@10½ ¢
Peter Wright & Sons, ℔ lb, 84 to 349 lb, 11¢; 350 to 600 lb, 11½ ¢.

Anvil, Vice and Drill—
Millers Falls Co., $18.00.....15&10%

Apple Parers— See *Parers, Apple, &c.*

Aprons, Blacksmiths'—
Livingston Nail Co.....10%

Augers and Bits—
Com. Double Spur....75¢&10@80%
Jennings' Patn., Bright.65¢&10@70%
Black Lip or Blued...65@65¢&5%
Boring Mach. Augers.....70%
Car Bits, 12-in. twist.....40¢&10%
Ford's Auger and Car Bits.....40&5%
Ft. Washington Auger Co., Conard's 35%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip. R. Jennings' list, 25&7½%
No. 30, R. Jennings' list.....50%
Russell Jennings'.....25&10&2½%
L'Hommedieu Car Bits.....15%
Mayhew's Countersink Bits.....45%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist.....60%
Snell's King Auger Bits.....50%
Swan's .....65&10@70%
Swan's, Jennings' Pattern.....50%
Wright's Jennings' Bits.....50%

Bit Stock Drills—
See *Drills, Twist.*

Expansive Bits—
Clark's Pattern, No. 1, ℔ doz., $26; No. 2, $18.....60&10%
Ford's, Clark's Pattern...60&5@60&10%
C. E. Jennings & Co., Steer's Pat..25%
Lavigne Pat., small size, $18.00; large size, $26.00.....60&10%
Swan's 60%

Gimlet Bits—
Per gro.
Common Dbl. Cut.....$3.00@3.25
German Pattern, Nos. 1 to 10, $4.75; 11 to 13, $5.75

Hollow Augers—
Bonney Pat., per doz..$5.50@6.00
Ames .....20&10%
Universal 20%

Ship Augers and Bits—
Ship Augers.....40&10@—%
Ford's .....33⅓&5%
C. E. Jennings & Co.:
L'Hommedieu's 6%
Watrous' .....33⅓&7½%
Snell's 40%

Awl Hafts—See *Handles, Mechanics' Tool.*

Awls—
Brad Awls:
Handled .....gro, $2.75@3.00
Unhdled, Shidered..gro.63@66¢
Unhandled, Patent..gro.66@70¢
Peg Awls:
Unhandled, Patent..gro. 31@34¢
Unhdled, Shidered..gro. 65@70¢
Scratch Awls:
Handled, Com...gro. $3.50@4.00
Handled, Socket.gro.$11.50@12.00

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—
Single Bit, base weights: Per doz.
First Quality.....$4.75@5.00
Second Quality.....$4.25@4.50
Double Bit, base weights:
First Quality.....$7.00@7.50
Second Quality.....$6.50@6.75

Axle Grease—
See *Grease, Axle.*

Axles— *Iron or Steel.*
Concord, Loose Collar...4¼@4½¢
Concord, Solid Collar....4½@5 ¢
No. 1 Common, Loose...3½@4 ¢
No. 1½ Com., New Style..4¼@4¾¢
No. 2 Solid Collar.....4¼@4¾¢
Half Patent:
Nos. 7, 8, 11 and 12.....70%
Nos. 13 to 14.....70%
Nos. 15 to 18...70&10@70&10&5%
Nos. 19 to 22...70&10@70&10&5%

Boxes, Axles—
Common and Concord, not turned .....lb., 5@6¢
Common and Concord, turned, lb., 6@7¢
Half Patent.....lb., 9½@10¢

Bait— Fishing—
Hendryx:
A Bait.....20%
B Bait.....25%
Competitor Bait.....20&5%

Balances— Sash—
Caldwell new list.....50&10%
Pullman .....50&10%

Spring—
Light Spring Balances..60@60&5%
Chatillon's:
Light Spg. Balances.....50@50&10%
Straight Balances.....40@40&10%
Circular Balances.....50&10%
Large Dial.....30%

Barb Wire—See *Wire, Barb.*

Bars— Crow—
Steel Crowbars, 10 to 40 lb.... per lb., 2¼@2½¢

Towel—
No. 10 Ideal, Nickel Plate..℔ gro. $8.50

Beam, Scale—
Scale Beams.....40%
Chattillon's No. 1.....30%
Chatillon's No. 2.....40%

Beaters, Carpet—
Holt-Lyon Co.:
No. 12 Wire Coppered ℔ doz. $0.80; Tinned $0.85
No. 11 Wire Coppered ℔ doz. $1.15; Tinned $1.20
No. 10 Wire Tinned.....℔ doz. $1.50

Beaters Egg—
Dover Stamping & Mfg. Co.: Genuine Dover, per gro., No. 1, Tumbler Size, $7.50; No. 2, Family Size, $7.50; No. 3 Extra Family Size, $24.00; No. 4, Hotel Size, $30.00.
Holt-Lyon Co.: Holt, per doz., No. 5, Jap'd, $0.80; No. A, Jap'd, $1.15; No. B, Jap'd, $1.85; No. 6, Jap'd, $1.65.
Lyon, Jap'd, per doz., No. 2, $1.35.
Taplin Mfg. Co.: Improved Dover, per gro., No. 60, $6.00; No. 75, $6.50; No. 100, $7.00; No. 102, Tin'd, $8.50; No. 150, Hotel, $15.00; No. 152, Hotel Tin'd, $17.00; No. 200, Tumbler, $8.50; No. 202, Tumbler Tin'd, $9.50; No. 300, Mammoth, per doz., $25.00.

Bellows—
Blacksmith, Standard List:
Split Leather.....60¢&10@65%
Grain Leather.....50@50&10%

Hand— *Net Prices.*

Inch..	6	7	8	9	10
Doz..	$5.00	5.50	6.00	6.50	7.50

Molders—

Inch..	10	12	14	16
Doz..	$7.50	9.00	12.00	15.00

Bells— Cow—
Wrought Cow Bells.....75%
Jersey .....75&10%
Texas Star.....50%

Door—
Home, R. & E. Mfg. Co.'s.....55&10%

Hand—
Polished, Brass.....60¢@60&10%
White Metal.....60@60&10%
Nickel Plated.....50&10%
Swiss .....50&10%
Cone's Globe Hand Bells.....33⅓@33⅓%

Miscellaneous—
Farm Bells.....lb., 2¼@2½¢
Church and School....60@60&10%

Belting— Leather—
First Quality, Ex. Hy., Strictly Short Lap.....60&10%
Standard .....70&10@70&10&5%
Light Double.....75&10%
Cut Leather Lacing.....50%
Leather Lacing Sides, per sq. ft. 23@24¢

Rubber—
Competition (Low Grade), 70¢&10@75%
Standard .....60¢&10@70%
Best Grades.....40@50%

Bench Stops—
See *Stops, Bench*

Benders and Upsetters, Tire—
Green River Tire Benders and Upsetters 20%

Bicycle Goods—
John S. Leng's Son & Co.'s 1908 list:
Chain, Parts, Spokes.....50%
Tubes 60%

Bits—
Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks Tackle—
Common Wooden.....75@75&5%
B. & L. B. Co.:
Boston Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50&10%; Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Steel, 50&10%; Wire Rope Snatch, 50%.
Lane's Patent Automatic Lock and Junior 30%
See also Machines, Hoisting.

Boards, Stove—
Paper and Wood Lined.....55%
Embossed 55%

Boards, Wash—
See *Washboards.*

Bobs, Plumb—
Keuffel & Esser Co.....33⅓&10%

Bolts Carriage, Machine, &c.—
Common Carriage (cut thread):
⅜ x 6 and smaller..75&5@—%
Larger and longer....70&5@—%
Phila. Eagle, $3.00 list...80@—
Bolt Ends.....70&10@—%
Machine (Cut Thread):
⅜ x 4 and smaller..75&10@—%
Larger and longer...70&10@—%

Door and Shutter—
Cast Iron Barrel, Japanned, Round Brass Knobs:

Inch ...	3	4	5	6	8
Per doz..	$0.30	.35	.45	.60	.80

Cast Iron Spring Foot, Jap'd:

Inch	6	8	10
Per doz.....	$1.20	1.50	2.25

Cast Iron Chain, Flat, Japanned:

Inch	6	8	10
Per doz.....	$1.00	1.40	1.65

Cast Iron Flat Shutter, Jap'd, Brass Knobs:

Inch	6	8	10
Per doz.....	$0.75	.95	1.25

Wrought Barrel Japanned, 80&10@80&10&5%
Barrel Bronzed.....60&10%
Spring .....70&10@70&10&10%
Shutter .....50&5@50&10&5%
Square Neck.....75@75&10%
Square .....70&10&10@80%
Ives' Mortise.....10%
Ives' Wrought Metal.....10%

Expansion—
F. H. Evans' Crescent.....40@60%
Richards Mfg. Co.....55&10%
Star Expansion Bolt Co.:
Star, Lag Screw Type..60&10&5&2½%
Star, Wood Screw Type.....40%
Star, Machine, Single Wedge....60%
Star, Machine, Double Wedge....60%
Steward & Romain Mfg. Co.:
Style No. 13, Double.....60%
Style No. 1, Single.....60%
Style No. 100, Dbl. Jaw, Single..55%
Lag Screw.....66⅔%

Plow and Stove—
Plow .....65&5@70%
Stove .....85@85&5%

Tire—
Common Iron.....80%
Norway Iron.....80%
American Screw Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84...82½%
Bay State, list Dec. 28, '99.....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84...82½%
Eclipse, list Dec. 28, '99.....80%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....80%
Norway Phila., list Oct. '84.....80%
Eagle 82½%
Shelton Co.:
Tiger Brand, list Dec. 28, '99....80%
Phila. Eagle, list Oct. 16, 1884..82½%
Upson Nut Co.:
Tire Bolts.....72½%

Borers, Bung—
Borers Bung, Ring, with Handle:

Inch.....	1¼	1½	1¾	2
Per doz...	$5.80	5.60	6.40	8.00
Inch.....	2¼	2½		
Per doz.....	$8.65	11.50		

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.75; No. 3, $2.50 each.....25%

Boxes, Mitre—
C. E. Jennings & Co.....25%
Langdon, New Langdon and Langdon Improved, 20&10%; Langdon Acme .....15&10%
Perfection 40%
Searey 45%

Braces—
Comman Ball, American....$1.50
Barber's .....50&10&10@60&10%
Fray's Genuine Spofford's.....60%
Fray's No. 61, 166, 206, 614.....50%
C. E. Jennings & Co.....50&5%
Mayhew's Ratchet.....60%
Mayhew's Quick Action Hay Pat...50%
Millers Falls Drill Braces.....25&10%
P., S. & W. Co., Peck's Pat....60&10%

Brackets—
Wrought Steel.....75¢&10&5@80%
Bradley Metal Clasp...80&10@80&10&5%
Griffin's Pressed Steel.....75@75&10%
Griffin's Folding Brackets.....70&10%
Taplin Victor Handy Egg Beater Bracket .....℔ doz. $1.50

Bright Wire Goods—
See *Wire and Wire Goods.*

Broilers—
Kilbourne Mfg. Co.....75&20%
Wire Goods Co.....75%

Buckets, Galvanized—

M'fr's list, price per gross.	*Quart..*	*10*	*12*	*14*	
Water, Reg...	*26.85*	*29.50*	*33.50*		*10&7½&5&5%*
Water, Hvy...	*45.35*	*48.00*	*52.00*		
Fire, Rd. Btm..	*32.00*	*34.65*	*38.65*		
Well	*37.35*	*41.35*	*45.35*		

Bull Rings—See *Rings, Bull.*

Butts— Brass—
Wrought, High List, Oct..6.'06.65%
Cast Brass, Tiebout's.....40&10%

Cast Iron—
Fast Joint, Broad....40&10@50%
Fast Joint, Narrow...40&10@50%
Loose Joint.....70&10@75%
Loose Pin.....70&10@75%
Mayer's Hinges.....70@70&5
Parliament Butts.....70@70&5

Wrought Steel—
Bright.
Light Narrow, Light Reversible .....70&5%
Reversible and Broad..70&5%
Loose Joint, Narrow, Light Inside Blind, &c.....70%
Back Flaps, Table Chest..65%
Japanned.
Light Narrow, Loose Pin, 40&5%
Light Narrow, Ball Tip..60%
Broad .....40&5%
Steeple Tipped.....70%
Ball Tipped.....70%

Extra, 10—

Cages, Bird—

Hendryx Brass: Series 3000, 5000, 1100, net list; 1200, 15%; 200, 300, 900 ..... 30%
Hendryx Bronze: Series 700, 800.... 30%
Hendryx Enameled..... 35%

Calipers—See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong, per 100 lb., $3.50@$3.85
Sharp, 1 prong, per 100 lb., $4.00@$4.35
Burke's, 1 pg. Blunt Toe, 3¾¢; 2 pg. Blunt Toe, 4¼¢; 1 pg. Sharp Toe, 4¼¢; 2 pg. Sharp, 4¾¢; Blunt Heel, 4¼¢; Sharp Heel..... 4¾¢
Lautier, Blunt, 4@4¼¢; Sharp, 4½@4¾¢
Perkins', Blunt, ℔ lb, 3.65¢; Sharp, 4.15¢

Can Openers—

See *Openers, Can.*

Caps, Percussion—

Eley's E. B...... 52@55¢
G. D...... *per M* 34@35¢
F. L...... *per M* 40@42¢
G. E...... *per M* 48@[illegible]
Musket..... *per M* 62@63¢

Primers—

Berdan Primers, $2 per M.. 20&10%
Primer Shells and Bullets.. 15&10%
All other primers per M. $1.52@1.60

Carpet Stretchers—

See *Stretchers, Carpet.*

Cartridges—

Blank Cartridges:
32 C. F., $5.50..... 10&5%
.38 C. F., $7.00..... 10&5%
22 cal. Rim, $1.50..... 10&5%
32 cal. Rim, $2.75..... 10&5%
B. B. Caps, Con. Ball, Scgd. $190
B. B. Caps, Round Ball..... $1.40
Central Fire..... 25%
Target and Sporting Rifle. 15&5%
Primed Shells and Bullets. 15&10%
Rim Fire, Sporting..... 50%
Rim Fire, Military..... 15&5%

Casters—

Bed..... 65&10@70%
Plate..... 60@60&5%
Philadelphia..... 70&10@75%
Acme, Ball Bearing..... 35%
Gem (Roller Bearing)..... 70&10&10&5%
Steel Gem (Roller Bearing)..... 70%
Standard Ball Bearing..... 45%
Yale (Double Wheel) low list... 40&10%

Cattle Leaders—

See *Leaders, Cattle.*

Chain, Proof Coil—

American Coil, Straight Link:

3-16	*¼*	*5-16*	*⅜*	*7-16*	*½*	*⅝*
$8.15	*5.55*	*4.60*	*3.95*	*3.75*	*3.65*	*3.55*

¾-⅞-1 *1⅛ to 1¼ inch.*
$3.45 *3.55*
In cask lots, deduct 25¢.
German Coil..... 60@60&5%
German Pattern Coil:
6-0 to 1..... 70&5@70&10%
2 and 3..60&10&10@60&10&10&5%
4, 5 and 6.....50&10@50&10&5%

Halter—

Halter Chains..... 60&5@60&10%
German Pattern Halter Chains, list July 2¼, '97.... 60&10&5@70%
Covert Mfg. Co.:
Halter ..... 35&5%

Cow Ties—

See *Halters and Ties.*

Trace, Wagon, &c.-

Traces, Western Standard: 100 pr.
6½—6-3, Straight, with ring.$28.00
6½—6-2, Straight, with ring.$29.00
6½—8-2, Straight, with ring.$32.00
6½—10-2, Str'ght, with ring.$37.00
NOTE.—Add 2c per pair for Hooks Twist Traces: add per pair for Nos. 2 and 3, 2c: No. 1, 3c; No. 0, 4c to price of Straight Link.
Eastern Standard Traces, Wagon *Chain, &c*...60&10@60&10&5%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron..... 60&10&7½%
Brass..... 65%
Safety and Plumbers' Chain. 75%
Gal. Pump Chain....*lb.*, 4½@5%
Bridgeport Chain Co.:
Triumph Halter and Coil. 35&2½@40%
Triumph Dog..... 50&10@60%
Brown Halter and Coil.... 45@50&5%
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stallion 40%
Oneida Community:
American Halter, Dog and Kennel Chains ..... 35&2½@40%
Niagara Dog Leads and Kennel Chains ..... 45@50&5%
Wire Goods Co.:
Dog Chain..... 70%
Universal Dbl.-Jointed Chain.... 70%

Chain and Ribbon, Sash—

Oneida Community:
Steel Chain..... 60%
Pullman:
Bronze Chain, 60%; Steel Chain, Coppered ..... 60&10%
Sash Chain Attachments, per set..8¢
Aluminoy Sash Ribbon, per 100 ft. ..... $2.00@$5.00
Sash Ribbon Attachments, per set..8¢

Chalk—

Carpenters' Blue.....*gro.*, 50¢
Carpenters' Red.....*gro.*, 50¢
Carpenters' White.....*gro.*, 40¢

Checks, Door—

Bardsley's 45%
Pullman, per gro..... $54.00
Russwin 33⅓%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools..... 55%
Youths' Chests, with Tools..... 40%
Gentlemen's Chests, with Tools..30%
Farmers', Carpenters, etc., Chests, with Tools 20%
Machinists' and Pipe Fitters' Chests, Empty..... 45%
Tool Cabinets..... 45%
C. E. Jennings & Co.'s Machinists' Tool Chests..... 7½%

Chisels—Socket Framing and Firmer

Standard List.....80&10@—%
Buck Bros..... 30%
C. E. Jennings & Co.:
Socket Firmer No. 10..... 25&7½%
Socket Framing No. 15..... 25&7½%
Swan's ..... 66⅔@70%
L. & I. J. White & Co.....30@30&5%

Tanged—

Tanged Firmers.....30&5@35%
Buck Bros..... 30%
C. E. Jennings & Co. Nos. 191, 181..25%
L. & I. J. White Co..... 25&5%

Cold—

lb.
Cold Chisels, good quality. 13@15¢
Cold Chisels, fair quality. 11@12¢
Cold Chisels, ordinary.... 9@10¢

Chucks—

Almond Drill Chucks..... 35%
Almond Turret Six-Tool Chuck..... 40
Beach Pat, each $8.00..... 35&5%
Empire 25%
Blacksmiths' 25%
Jacobs' Drill Chucks..... 35%
Pratt's Positive Drive..... 25%
Skinner Lathe Chucks:
Independent 35%
Universal, Reversible Jaws..... 35%
Universal, Com. Style Jaws..... 40%
Combination, Reversible Jaws..... 35%
Combination, Com. Style Jaws...40%
Round Body or Box Body, 2 Chuck Jaws 25%
Geared Scroll Chucks..... 25%
Drill Chucks:
New Model, 25%; Geared Pattern, 25%; Skinner Patent, ...25%
Positive Drive..... 40%
Planer Chucks..... 20
Standard 45%
Drill Press Vises..... 30%
Face Plate Jaws..... 35%
Standard Tool Co.:
Improved Drill Chuck..... 45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 17, 40%; No. 21..... 35%
Scroll Combinations, Nos. 83 and 84 ..... 30%
Geared Scroll, Nos. 33, 34 and 35..25%
Independent Iron, Nos. 18 and 318.35%
Independent Steel, No. 64..... 25%
Union Drill, Nos. 000, 00, 100, 101, 102, 103, 104..... 35%
Union Czar Drill..... 25%
Universal, 11, 12, 16, 17, 13, 14, 15..40%
Universal No. 42..... 35%
Iron Face Plate Jaws, Nos. 28, 30, 48 and 50..... 35%
Steel Face Plate Jaws, Nos. 70 and 72 ..... 30%
Westcott Patent Chucks:
Lathe Chucks..... 50%
Little Giant Auxiliary Drill..... 50%
Little Giant Double Grip Drill...50%
Little Giant Drill, Improved..... 50%
Oneida Drill..... 50%
Scroll Combination Lathe..... 50%
Whitaker Mfg. Co.:
National Drill..... 25%

Clamps—

Adjustable Hammers..... 20&5%
Carriage Makers', Star, P., S. & W. Co. 50%
Besly, Parallel..... 33⅓&10%
Myers' Hay Rack..... 50%
Lineman's Swedish Neverturn..... 65%
Wood Workers' Hammers..... 40&5%
Saw Clamps, see Vises, Saw Filers'

Cleaners, Drain,

Iwan's Champion, Adjustable..... 50%
Iwan's Champion, Stationary..... 40%

Sidewalk—

Star Socket, All Steel..℔ doz. $4.05 net
Star Shank, All Steel..℔ doz. $3.24 net
W. & C. Shank, All Steel, ℔ doz., 7½ in., $3.00; 8 in., $3.25.

Cleavers, Butchers'—

Foster Bros..... 30%
Fayette R. Plumb..... 30%
L. & I. J. White Co..... 30%

Clippers, Horse and Sheep—

Chicago Flexible Shaft Co.:
1902 Chicago Horse, each..$10.75
20th Century Horse, each...$5.00
Lightning Belt Horse, each.$15.00
Chicago Belt Horse, each..$20.00
Stewart's Enclosed Gear Roll Bearing Horse, each.....$6.75
Stewart's New Model Sheep Shearing Machine, each.$12.75
Stewart Enclosed Gear Shearing Machine, No. 8, each..$9.75
} 20%

Clips, Axle—

Regular Styles, list July 1, '05, 80&80&10%

Cloth and Netting, wire

—See *Wire, &c.*

Cocks, Brass—

Hardware list:
Plain Bibbs, Globe, Kerosene, Racking, Liquor, Bottling, &c 75%
Compression Bibbs..... 70%

Coffee Mills—

See *Mills, Coffee.*

Collars, Dog—

Nickel Chain, Walter B. Stevens & Son's list..... 40%
Leather, Walter B. Stevens & Son's list 40%

Compasses, Dividers, &c.

Ordinary Goods.....70&10@75%

Conductor Pipe,—

L. C. L. to Dealers:

	Gal. Steel.	*Charcoal.*	*Copper.*
Northeastern:			
70&10%	*50&10&7½%*	*50&10%*	
Eastern:			
70&10&5%	*50&10&7½%*	*50&10%*	
Central:			
75&5%	*60%*	*50&10%*	
Northwestern:			
75&2½%	*60%*	*50&10%*	
Western:			
70&7½%	*50&12½%*	*50&5%*	
Tennessee:			
70&10%	*50&12½%*	*50&10%*	
Southern:			
70%	*50&12½%*	*50&5%*	
Southwestern:			
70%	*50&5%*	*50&5%*	

Terms, 60 days: 2% cash 10 days. Factory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—

L. & G. Mfg. Co.:

Gal.	2	3	4	6	8
Galvanized,ea.	$1.85	$2.00	$2.25	$2.90	$3.90

Galvanized, Lined, side handles,

Gal.	2	3	4	6	8
Each	$1.95	$2.15	$2.40	$3.30	$4.15

White Enameled..... 10%
Agate Lined..... 10%

Coppers' Tools—

See *Tools, Coopers'.*

Coppers, Soldering—

Soldering Coppers, 3 lb. to pair and heavier, 20¢; lighter than 3 lb. to pair.....22¢

Cord—Sash—

Braided, Drab.....*lb.* 35¢
Braided, White, Com., Nos. 8 to 12, 20¢; No. 7, 20½¢; No. 6, 21½¢. In lots of 12 doz. or over, 1 cent less per pound.
Cable Laid Italian, lb., No. 18. 37¢
Italian, lb., A, No. 18, 25¢; B, 22¢
Common India.....*lb.*, 11@11½¢
Cotton Sash Cord, Tw'ted. 18@20¢
Patent Russia.....*lb.*...20¢
Cable Laid Russia.....*lb.*..21¢
India Hemp, Br'd'd.....*lb.*..21¢
India Hemp, Twisted...*lb*.13@14¢
Patent India, Twisted..*lb*...17¢
Pearl Braided, cotton, No. 6, ℔ lb, 20½¢; No. 7, 19½¢; Nos. 8 to 12, 19½¢, in 12 doz. to 100 doz. lots.
Eddystone, Braided, Nos. 8 to 12, 26¢; 7, 26½; 6, 27½¢.
Harmony Cable Laid Italian, Nos. 7 to10..... ℔ lb 23¢
Pullman:
Wire Sash Cord..... 10%
Sash Cord Attachments, per 100..$2.00
Samson, Nos. 8 to 12:
Braided, ℔ lb., Drab Cotton, 55¢; Italian Hemp, 40¢@ 50¢; Linen, 65¢; White Cotton, 50¢; Spot Cord.....50¢
Massachusetts, White...℔ lb 40¢
Massachusetts, Drab...℔ lb 45¢
Phoenix, White, Nos 8 to 12....27¢
} 25%
Silver Lake, per lb.:
A, Drab, 45¢; A, White, 40¢; B, Drab, 40¢; B, White, 35¢; Italian Hemp, 40¢; Linen....57½¢
See also Chain and Ribbon.

Wire, Picture—

Full Length.....90@—%
Short Length.....90&20@—%
Hendryx Standard Wire Picture Cord, old list, 85&10%
Turner & Stanton Co. Wire Picture Cord 90%

Cradles—

Grain 50%

Crayons—

White Round Crayons, Cases, 100 gro., $8.00, $8.50, $9.00 and $10.00 according to grade.
Zelnicker's Lumber: ℔ gro.
White and Purple, Indelible....$7.50
Blue, Red, Green, Yellow and Terra Cotta, $6.50; Black.....$4.50
Giant Lumber, 5¼ in. x 15-16 in. round, all colors, $12.00; Indelibles, $14.00; Blacks.....$10.00
Genuine Soapstone, Metal Workers', 5 in. x ¼ in. Round, $2.50; 5 in. x ¼ in. Square, $1.75; 5 x ½ x 3-16, $2.50; 5 x 1¼ x 3-16.....$3.00
Suremark, Black, $2.25; Blue, Red and Yellow.....$2.50

Crooks, Shepperds'—

Fort Madison, per doz., Heavy, $5.50; Light $5.00

Crow Bars—See *Bars, Crow.*

Cultivators—

Victor Garden..... 50%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1847, ℔ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor..... ℔ doz. $3.00
Wm. Rogers & Son..... ℔ doz. $2.50

Cutters—Glass—

H. H. Mayhew Co..... 40%
Red Devil..... 60%
B. Mfg. Co..... 40%
Woodward 50%

Meat and Food—

American 30%
Nos. 401 402 403 404 405 406 407
Each $5 $7 $10 $12 $25 $50 $60
Enterprise:
Nos.....5 10 12 22 32
Each ..$2 $3 $2.75 $4.50 $6 25@25&7½%
No. 202, $1.50..... 40&7½%
P., S. & W. Co.:
Ideal ..... 40@40&5%
Hales ..... 60&5
Little Giant..... ℔ doz. 40@50
Nos. 305 310 312 320 325
$35.00 $48.00 $14.00 $72.00 $68.00
New Triumph No. 605, ℔ doz. $24.00 40
Russwin Food, No. 1, $24.00; No. 2, $27.00; 3, $12.00.....45&10&10
$15.00 $18.00
Enterprise Beef Shavers..... 25@30

Siaw and Kraut—

Henry Disston & Sons:
Slaw and Kraut Cutters..... 35
Corn Graters..... 30
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife....℔ doz. $3.00
Combined Slaw Cutter and Corn Grater ..... ℔ doz. $4.00

Tobacco—

All Iron, Cheap...*doz, $4.25@4.50*
Enterprise ..... 25@30
National, ℔ doz., No. 1, $21; No. 2, $18 40

Diggers, Post Hole, &c—

Disston's:
Rapid, ℔ doz., $24.00..... 25
Samson, ℔ doz., $34.00..... 25
Iwan's Pat. Post Hole and Well Auger 40
Vaughan Pattern Post Hole Augers, ℔ doz., $7.00
Perfection Post Hole Diggers, ℔ doz. $8.50
Split Handle Post Hole Diggers, ℔ doz., $7.50
Hercules Pattern, ℔ doz..... $9.50
Kohler's, ℔ doz., Universal, $14.00; Little Giant, $12.00; Hercules, $10.00; Invincible, $9.00; Rival, $8.50; Pioneer..... $7.50
Never-Break Crucible Steel Post Hole Diggers 60

Dividers—See *Compasses.*

Drawing Knives—

See *Knives, Drawing.*

Dressers Emery Wheel—

Sterling Emery Wheel Dressers..... 35
Sterling Wheel Dresser Cutters..... 35

Drills and Drill Stocks—

Blacksmith's Common Drilling Machines ..... *$1.50@1.75*
Breast, Millers Falls..... 15&10
Breast, P., S. & W..... 33⅓
C. & C. Ratchet..... 25
Reversible Ratchet Die Stocks.... 25
Goodell Automatic Drills.50&10@60&10
Millers Falls Automatic Drills, Graves', per doz., Nos. 1, $4.86; 2, $8.16.
Millers Falls Automatic Drills.33⅓&10
Ratchet, Curtis & Curtis..... 25
Ratchet, Parker's..... 40
Ratchet, Weston's..... 40
Ratchet, Weston's, Style H Improved ..... 40@40&5%
Ratchet, No. 012..... 40@40&5%
Ratchet, Celebrated..... 40@40&5%
Ratchet, Whitney's, P., S. & W.. 40&10@50%
Whitney's Adjustable, No. 10, $12.00, 33⅓%

Twist Drills—

Bit Stock..... 70@70&5%
Taper and Straight Shank, 60&10@70%

Drivers, Screw—

Screw D'ver Bits, per doz. 45@50¢
Balsey's Screw Holder and Driver, ℔ doz., 2½-in., $6; 4-in., $7.50; 6-in., $9 50
Buck Bros.' Screw Driver Bits..... 30
Champion 30
Disston's 70
Fray's Hol. H'dle Sets, No. 3, $12..50
Ford's Brace Screw Drivers....40&10
Gay's Double Action Ratchet..... 35
Goodell's Auto..... 65@65&10
Mayhew's Black Handle..... 40
Mayhew's Monarch..... 40
Millers Falls, ℔ doz., Nos. 11, $9.95; 12, $13.73; 20, $8.17; 21, $8.46; 41, $13.43; 42, $17.21.
Smith & Hemenway Co., Neverturn, 66⅔%; Elmora, 60%; Star, 30&10%
Swan's:
Nos. 7565 to 7568, 60%; No. 7540, 40&10%

Eave Trough, Galvanized—

Territory.	*Gal. Steel.*	*Copper.*
Northeastern..	*75&10&5%*	*50&10%*
Eastern.....	*80%*	*50&10%*
Central.....	*80&10&5%*	*50&10%*
Northwestern..	*80&10&5%*	*50&10%*
Western.....	*80&5%*	*50&5%*
Tennessee.....	*80&5%*	*50&10%*
Southern.....	*75&10%*	*50&5%*
Southwestern..	*75&10&2½%*	*50&5%*

Terms.—2% for cash. Factory shipments generally delivered.
Note.—Lower prices are made in some sections.
See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory shipments, all territories: Galv. Steel, Galv. C. I. and Copper.
Sizes 2, 3, 4..... 80%
Sizes 1½, 2½, 3½, 5, 6...60&10%
No. 26..... 50%
No. 24..... 25%
Copper Elbows..... 50%

Elbows, Stove Pipe—

Edwards, Standard Blue....40&10&10%
Edwards, Royal Blue..... 40&10&10%
Reeves, Dover, Flat Crimp..40&10&5%

Emery, Turkish—

	4 to 46:	*5 to 220:*	*Flour.*
Kegs.....*lb.*	*5 ¢*	*5¼¢*	*3¼¢*
½ Kegs.....*lb.*	*5¼¢*	*5¾¢*	*3¾¢*
¼ Kegs.....*lb.*	*5½¢*	*6 ¢*	*4 ¢*

10-lb. cans, 10 in case....6½¢ 7 ¢ 6 ¢
10-lb. cans, less than 10.....10 ¢ 10 ¢ 8 ¢
Less quantity..10 ¢ 10 ¢ 8 ¢

NOTE.—In lots 1 to 3 *tons a discount of* 10% *is given.*

Extensions, Bit—
Ford's Auger Bit Extensions....40&5%

Extractors, Lemon Juice—
—See *Squeezers, Lemon.*

Fasteners, Blind—
Zimmerman's Jap'd and Galv., 50 & 5%; Bronze and Plated.....50%
Walling's 50%
Upson's Patent.....40%

Cord and Weight—
Ives, ₱ gro., $1.08.....10%
Titan, ₱ gro., $0.66.....10%

Corrugated—
Acme Corrugated Fasteners.....70%

Faucets—
Cork Lined.....50&10@60%
Metallic Key, Leather Lined, ... 60&10@70%
Red Cedar.....40&5@40&10&5%
Petroleum .....70&10@75%
B. & L. B. Co.:
Metal Key.....60&10%
Star 60%
West Lock.....50&10%
John Sommer's Peerless Tin Key....40%
John Sommer's Boss Tin Key.....50%
John Sommer's Victor Mtl. Key.50&10%
John Sommer's Duplex Metal Key..60%
John Sommer's Diamond Lock.....40%
John Sommer's I.X.L. Cork Lined..50%
John Sommer's Reliable Cork Lined.. 50&10%
John Sommer's Chicago Cork Lined.60%
John Sommer's O. K. Cork Lined....50%
John Sommer's No Brand, Cedar....50%
John Sommer's Perfection, Cedar....40%
Self Measuring:
Enterprise, Self Measuring and Pump, ₱ doz., $36.00.....40&10%
Lane's, ₱ doz., $36.00.....40&10%
National Measuring, ₱ doz, $36.40&10%

Felloe Plates—
See *Plates, Felloe.*

Files— Domestic—
List Nov. 1, 1899.
Best Brands.....70&10@75&10%
Standard Brands.....75&10@80%
Lower Grade....75&10&10@80&10%
Gold Medal.....70%
McCaffrey's American Standard, 60&10&10%

Imported—
Stubs' Tapers, Stubs' list, July 24, '97.....33⅓@40%

Fixtures, Fire Door—
Richards Mfg. Co.:
Universal, No. 103; Special, No. 104 .....$3.75
Fusible Links, No. 96.....50%
Expansion Bolts, No. 107.....60&10%

Grindstone—
Net Prices:

Inch	*15*	*17*	*19*	*21*
Per doz.	*$3.60*	*3.85*	*4.15*	*4.65*

Peck, Stow & Wilcox Co.:

In	15	17	19	21	24	
	$4.00	4.40	4.75	5.50	6.50	....30%

Reading Hardware Co.....60%

Fodder Squeezers—
See *Compressors.*

Forks—
NOTE.—Manufacturers are selling from the list of September 1, 1905, but many jobbers are still using list of August 1, 1899, or selling at net prices.
Iowa Dig-Ezy Potato.....60&10%
Victor, Hay.....60&15&2½%
Victor, Manure.....66⅔%
Victor, Header.....65%
Champion, Hay.....66⅔%
Champion, Header.....65%
Champion, Manure.....60&15&2½%
Columbia, Hay.....60&20%
Columbia, Manure.....70%
Columbia, Spading.....70&12½%
Hawkeye Wood Barley.....40%
W. & C. Potato Digger.....60&10%
Acme Hay.....60&20%
Acme Manure, 4 tine.....60&10&5%
Dakota Header.....60&20%
Jackson Steel Barley.....60&20%
Kansas Header.....65%
W. & C. Favorite Wood Barley....40% Plated.—See Spoons.

Frames— Wood Saw—
White, S'g't Bar, per doz.75@80¢
Red, S'g't Bar, per doz.$1.00@1.25
Red, Dbl. Brace, per doz.$1.40@1.50

Freezers, Ice Cream—

Qt.....	*1*	*2*	*3*	*4*	*6*
Each....	*$1.25*	*$1.60*	*$1.90*	*$2.20*	*$2.80*

Fruit and Jelly Presses—
See *Presses, Fruit and Jelly.*

Fry Pans—
See *Pans, Fry.*

Fuse— Per 1000 Feet.
Hemp $2.75
Cotton 3.20
Waterproof Sgl. Taped..3.65
Waterproof Dbl. Taped..4.40
Waterproof Tpl. Taped..5.15
10&2½%

Gates, Molasses and Oil—
Stebbins' Pattern.....80@80&5%

Gauges—
Marking, Mortise, &c..50@50&10%
Chapin-Stephens Co.:
Marking, Mortise, &c.....50&50&10%
Disston's Marking, Mortise, &c..67½%
Wire, Brown & Sharpe's.....33⅓%
Wire, Morse's.....25%
Wire, P. S. & W. Co.....33⅓%

Gimlets— Single Cut—
Numbered assortments, per gro.
Nail, Metal, No. 1, $2.00; 2, $2.30
Spike, Metal, No. 1, $4.00; 2, $4.30
Nail, Wood Handled, No. 1, $2.30; 2, $2.60
Spike, Wood Handled, No. 1, $4.30; 2, $4.60

Glass, American Window
See *Trade Report.*

Glasses, Level—
Chapin-Stephens Co.....65@65&10%

Glue, Liquid Fish—
Bottles or Cans, with Brush, 25¢&10@50%
Elwell's 40%

Grease, Axle—
Common Grade...gro.$6.00@$6.50
Dixon's Everlasting, 10-lb. pails, ea. 85¢; in boxes, ₱ doz., 1 lb, $1.20; 2 lb.....$2.00
Helmet Hard Oil.....25%

Griddles, Soapstone—
Pike Mfg. Co.....33⅓@33⅓&10%

Grinders—
Pike Mfg. Co.:
Hand and Foot Power, Pyko Nos. 1, 2, 3; Pyko Primo; Pyko Peerless; Pyko Spiral (foot power).33⅓%
Mower Knife and Tool, $5.00..40&10%
Royal Mfg. Co.:
Alundum Grinding Machines, each, Nos. 01, $1.75; 1A, $2.50; 10, $5.00 .....30%
Alundum Sickle Grinders, each, Nos. 20, $5.00; 20A, $6.00; 20A Combined, $6.50.....30%
Alundum Disc Grinders, each, $2.50 .....30%

Grindstones—
Pike Mfg. Co.:
Improved Family Grindstones, ₱ inch, ₱ doz., $2.00.....33⅓%
Richards Mfg. Co., Eli and Cycle, Ball Bearing, mounted.....40%

Grips, Nipple—
Perfect Nipple Grips.....40&10&2%

Halters and Ties—
Cow Ties.....65@65&10%
Bridgeport Chain Co.:
Triumph Coil and Halters.35&2½@40%
Brown Coil and Halters...45@50&5%
Brown Cow Ties.....50&5@50&10&5%
Brown Tie Outs.....70&10@75&5%
Covert Mfg. Co.:
Web .....30&2%
Jute Rope.....35%
Sisal Rope.....20%
Cotton Rope.....45%
Hemp Rope.....45%
Oneida Community:
Am. Coil and Halters.....40@40&5%
Am. Cow Ties.....45@50%
Niagara Coil and Halters...45@50&5%
Niagara Cow Ties.....45&5@50&10&5%

Hammers—
Handled Hammers—
Heller's Machinists'....55&10@55&10&5%
Heller's Farriers.....40&5@40&10&5%
Peck, Stow & Wilcox Co.:
Crucible Steel.....40&10@50%
Farriers' .....40&10@50%
Riveting .....40&10@50%
Machinists' .....66⅔@5%
Blacksmiths' 50%
Fayatte R. Plumb:
A. E. Nail.....40&2½@40&12½%
Eng. and B. S. Hand.50&10&5@60&5%
Machinists' Hammers.....60&10&5%
Rivet and Tinners'.40&7½@40&12½&5%
Victor Magnetic Tack, ₱ gro....$7.75

Heavy Hammers and Sledges—
Under 3 lb., per lb., 50¢...80&10%
3 to 5 lb., per lb., 40¢...80&10&10%
Over 5 lb., per lb., 30¢.....
Over 5 lb., per lb., 30¢.80&10&10%

Handles—
Agricultural Tool Handles
Axe, Pick, &c....60&10@60&10&5%
Hoe, Rake, &c.....40%
Fork, Shovel, Spade, &c.:
Long Handles.....40%
D Handles.....40%

Cross-Cut Saw Handles—
Atkins' 40%
Champion 50%
Disston's 50%

Mechanics' Tool Handles—
Auger, assorted...gro.$3.00@$3.50
Brad Awl.....gro.$1.65@$1.75
Chisel Handles, Ass'd, per gro.:
Tanged Firmer, Apple, $2.40@ $2.65; Hickory.....$2.15@2.40
Socket Firming, Apple, $1.75@ $1.95; Hickory.....1.60@1.75
Socket Framing, Hickory, $1.60@$1.75
File, assorted.....gro.$1.30@$1.40
Hammer, Hatchet, &c., 60¢10@60&10&5%
Hand Saw, Varnished, doz., 80¢ 85¢; Not Varnished.....65@75¢
Plane Handles:
Jack, doz., 30¢; Fore, doz...45¢
Chapin-Stephens Co.:
Carving Tool.....30@30&10%
Chisel .....60@60&10%
File and Awl.....60@60&10%
Saw and Plane.....30@30&10%
Screw Driver.....30@30&10%
Millers Falls Adj. and Ratchet Auger Handles .....15&10%
Nicholson Simplicity File Handle.... ₱ gro. $0.85@$1.50
J. L. Osgood:
Indestructible File and Tool. ₱ gro., No. 1, $8.00; No. 2, $8.50; No. 3, $9.00; No. 4, $9.50; No. 5, $10.00.....gro. lots 10%
W. A. Zelnicker Supply Co.:
Hammer, ₱ doz., 12 in., $2.00; 14 in., $2.00; 16 in., $2.30; 18 12., $2.50; 20 in., $2.70; 22 in., $3.00; 24 in., $3.30; 26 in., $3.50; 30 in., $3.80.
Sledge, ₱ doz., oval, 30 in., $3.80; octagon, 30 in., $3.80; oval, 36 in., $4.00; octagon, 36 in.. $4.00.
Axe, ₱ doz., 28 to 34 in., $5.60; 36 in., $5.80.
Adze, ₱ doz., 36 in., $5.80; 36 in., $7.80.
Pick, ₱ doz., R. R., 36 in., $8.00; coal, 34 in., $5.80.
Hatchet, ₱ doz., 12 to 14 in., $2.00.
Extra 5&10% often given.

Hangers—
NOTE.—Barn Door Hangers are generally quoted per pair, without track and Parlor Door Hangers per double set with track, &c.
Chicago Spring Butt Co.:
Friction 25%
Oscillating 25%
Big Twin.....25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door.....50%
Elevator 30%
Railroad 50%
Cronk & Carrier Mfg. Co.:
Loose Axle.....60&10%
Roller Bearing.....70%
Griffin Mfg. Co.:
Solid Axle, No. 10, $12.00..60&10%
Roller Bearing, No. 11, $15.00, 60&10%
Roller Bearing, Ex. Hy., No. 22, $18.00.....60&10%
Bull Dog, $24.00.....70%
Lane Bros. Co.:
Parlor, Ball Bearing, $4.00; Standard, $3.15; No. 105, $2.85; New Model, $2.80; New Champion per set of 4 Hangers, complete with track.....$2.25
Barn Door, Standard.....60&10%
Hinged .....net $6.08
Covered .....60&5%
Special .....70&5%
Trolley Hangers and track..50%
Lawrence Bros.:
Advance .....55&10%
Cleveland .....70&7½%
Clipper, No. 75.....60%
Crown .....55&10%
Cyclone, No. 40.....net $6.50
Tandem, No. 50.....net $7.50
New York.....55&10%
McKinney Mfg. Co.:
Roller Bearing, Nos. 1 and 2..70%
Anti-Friction 60%
Hinged Hangers, King Charm.60%
Richards Mfg. Co.:
Hangers, Nos. 47, 48, 147, 247, 60&5%
Pioneer Wood Track, No. 3..$2.25
Roller B'r'g St'l Track No. 12.$2.20
Roller B'r'g St'l Track No. 13.$2.50
Roller B'r'g, Nos. 39, 41, 43, 70&7½%
Hero, Adj. Track No. 19..50&10%
Adjustable Track Tandem Trolley Track No. 16.....50&10%
Seal, Steel Track No. 8.....$2.25
Auto Adj. Track No. 22..50&5%
Trolley B, D, No. 17, $1.25; F, D, No. 120, $2.25; No. 121, $2.45; No. 150.....$2.50
Safety Underwriters F, D, No. 101 .....50%
Tandem No. 41..2½ and 3 60&10%
Palace, Adjustable Track No. 132 .....50&5%
Royal, Adjustable Track No. 122 .....50&10%
Ives' Wood Track No. 1.....$2.25
Trolley B, D, No. 20.....50&10%
Trolley B, D, No. 24, $1.30; No. 27, $1.40; No. 28.....$1.60
Roller Bearings, Nos. 37, 38, 39, 41, 43, 44, Sizes 1 and 2.70&7½%
Anti-friction, No. 42; No. 44, sizes 2½ and 3.....60%
Hinged Tandem No. 48....60&5%
Folding Door B. B, Swivel No. 135 .....40%
Taylor & Boggis F'y Co.'s Kidder's Roller Bearing, ₱ doz., 4 in., $12.00; 5 in., $14.00..40&10%
Myers' Stayon Hangers.....60%

Hangers— Garment—
Pullman Trouser, ₱ gro., No. 1 $9.00; No. 4, $21.00; No. 5, $16.50; No. 8, Black Enamel, $7.50; No. 10, $21.00; No. 12, $8.00; No. 15, Rods, $9.00; No. 18, Loops.....$10.00
Victor Folding.....₱ gro. $9.60

Gate—
Myers' Patent Gate Hangers, ₱ doz, net 50%

Joist and Timber—
Lane Bros. Co.....35%

Hasps—
Griffin's Security Hasp.....50&10%
McKinney's Perfect Hasp, ₱ doz..60%

Hatchets—
Regular list, first qual.40&12½@—
Second quality.....50&10&5@—

Heaters, Carriage—
Clark, No. 5, $1.25; No. 5B, $1.50; No. 3, $1.75; No. 3D, $2.00; No. 7D, $2.25; No. 3E, $2.50; No. 1, $3.00.....25%
Clark Coal, ₱ doz., $0.75.....20%

Hinges—
Blind and Shutter Hinges
Surface Gravity Locking Blind: Doz. Sets with Fastenings, Net. No. 1, $0.70; No. 3, $1.25; No. 5, $2.65.
Mortise Shutter.....80%
Mortise Reversible Shutter...80%
North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50.....10%
Charles Parker Co.....70@75%
Parker Wire Goods Co.
Hale & Benjamin Automatic Blind Hinges 20%
Hale's Blind Awning Hinges, No. 110, for wood, $9.00; No. 111, for brick, $9.00.....20%
Reading's Gravity.....60%
Stanley's Steel Gravity Blind Hinges, No. 1647½, ₱ doz, sets, without screws, $0.95; with screws, $1.25.
Wrightsville Hardware Co.:
O. S., Lull & Porter.....75&5%
Acme, Lull & Porter.....75%
Queen City Reversible.....75%
Shepard's Noiseless, Nos. 60, 65, 55 .....75&5%
Niagara, Gravity Locking, Nos. 1, 3 & 5.....75&5%
Clark's O. P., No. 1.....75&10%
Clark's O. P., Nos. 3 and 5....75&5%
Tip Pat'n, No. 1.....75&10%
Clark's No. 3.....75&5%
Buffalo Gravity Locking, Nos. 1, 3 & 5.....70&10&5%
Shepard's Double Locking.....75%
Champion Gravity Locking.....75&5%
Pioneer .....75&10%
Empire 65%
W. H. Co.'s Mortise Gravity Locking, No. 2.....60&10%

Gate Hinges—
Clark's or Shepard's—Doz. sets:

No.	*1*	*2*	*3*
Hinges with L't'chs	*$2.00*	*2.70*	*5.00*
Hinges only	*1.25*	*1.90*	*3.50*
Latches only	*.70*	*.75*	*.35*

New England:
With Latch.....doz..@$2.00
Without Latch.....doz..@$1.60
Reversible Self-Closing:
With Latch.....doz..@$1.75
Without Latch...doz. ...@$1.35
Western:
With Latch.....doz. $1.75
Without Latch.....doz..$1.15
Wrightsville Hardware Co.:
Shepard's or Clark's Hinges and Latches, Hinges only or Latches only, Nos. 1, 2 or 3.....70%

Miscellaneous—
Griffin Mfg. Co., Fleur de Lis Surface Hinges, ₱ doz. prs.....$1.00

Pivot Hinges—
Bommer Bros, Pivot, Ball Bearing 40%
Lawson Mfg. Co, Matchless.....30%

Spring Hinges—
Holdback, Cast Iron...$6.75@$7.00
Non-Holdback, C'st Iron$6.50@$6.75
J. Bardsley:
Bardsley's Non-Checking Mortise Floor Hinges.....40%
Bardsley's Patent Checking.33⅓%
Bommer Bros.:
Spring Butt Hinges.....40%
Surface Floor, Ball Bearing 40%
Mortise Floor, Ball Bearing.40%
Lavatory Hinges.....40%
Non-Holdback Screen Door, Nos. 2000 and 900.....40%
Holdback Screen Door, No. 999.....₱ gro, $9.00
Chicago Spring Butt Co.:
Chicago Spring Hinges.....25%
Triple End Spring Hinges....50%
Chicago (Ball Bearing) Floor.50%
Garden City Engine House...25%
Keene's Saloon Door.....25%
Columbian Hardware Co.:
Acme, Wrought Steel.....30%
Acme, Brass.....25%
American 30%
Columbia, ₱ gr., No. 14, $9.00; No. 18.....$25.00
Columbia, Adj., No. 7, ₱ gr.$12.00
Gem, new list.....30%
Clover Leaf and Acorn, per gro, ...$12.00
Oxford, new list.....30%
Floor Spring Hinges.....65&10%
Columbian Steel.....65&10%
Lawson Mfg. Co.:
Matchless Spring Hinges.....30%
Matchless Jamb Hinges.....30%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges 40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door.....₱ gr. $9.00
Chief Ball Bearings Floor Hinge 50%
Ball Bearing Door.....25%
No. 777, Sheet Steel Holdb'k. ₱ gr. pr.....$9.00
Standard Mfg. Co.:
Champion Double Acting Door Hinge .....25&10&10%
Standard Double Acting Floor Hinge .....25&10&10%
Superior Spring Hinge Co.:
Superior Floor Hinges.....33⅓%
Spring Hinges.....33⅓%
Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—
Strap and T Hinges, &c., list February 10, 1908:
Light Strap Hinges..50&10%
Heavy Strap Hinges..60&5%
Light T Hinges.....50%
Heavy T Hinges.....40%
Extra Hvy. T Hinges.50&10%
Hinge Hasps.....33⅓%
Cor. Heavy Strap....60&5%
Cor. Ex. Heavy T...50&10%
Extra 10&12½%.
Screw Hook and Strap. { *6 to 12 in..lb.3½¢* / *1½ to 20 in..lb.3½¢* / *22 to 36 in..lb.3 ¢*
Screw Hook and Eye:
½ to 1 inch.....lb.6½¢
⅝-inch .....lb.7½¢
½-inch .....lb.8½¢

Hitchers, Stall—
Covert Mfg. Co., Stall Hitchers..30&2%

Hods— Coal—
M'f'gr's list, price per gross:

Inch	*15*	*16*	*17*	*18*
Galv. Open	*$35*	*$39*	*$42*	*$46*
Jap. Open	*26*	*28*	*31*	*35*
Galv. Funnel	*43*	*48*	*53*	*56*
Jap. Funnel	*33*	*36*	*39*	*43*

10&7½&5%

Masons' Etc.
Cleveland Wire Spring Co.:
Steel Brick, No. 162.....each $1.05
Steel Mortar, No. 158.....each $1.35

Hoes—Eye—

Scovil and Oval Pattern, 60&10@60&10&10%
Grub, list Feb. 23, 1899, 70&10@70&10&10%
D. & H. Scovil.....27½%
Am. Fork & Hoe Co. (Scovil Pattern).....60%

Handled—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Cronk's Weeding, No. 1, $2.00; No. 2, $2.50
Star Double Bit.....$2.50
Ft. Madison Cotton Hoe....70&10&10%
Ft. Madison Crescent Cultivator Hoe, ₱ doz.....70&10%
Ft. Madison Mattock Hoes:
Regular Weight.....₱ doz. 40&5%
Junior Size.....₱ doz. $4.00
Ft. Madison Sprouting Hoe, ₱ doz., 60&10%
Ft. Madison Dixie Tobacco Hoe..... 75&10&7½%
Kretsinger's Cut Easy.....70&10%
Warren Hoe.....45&10%
W. & C. Ivanhoe.....75&2%
B. B. 6 in., Cultivator Hoe.....$3.40
B. B., 6½ in.....$3.50
Acme Wedding.....₱ doz., net, $4.35
W. & C. L'tning Shuffle Hoe, ₱doz.$5.25

Hoisting Apparatus—

See *Machines, Hoisting.*

Holders—Bit—

Angular, ₱ doz. $24.00.....45&10%

Door—

Bardsley's, Iron, 40%; Brass and Bronze.....25%
Empire.....50%
Pullman.....25%
Richards Mfg. Co.: No. 117, Ever-ready, 40%; Nos. 118, 119, Sure Grip.....50%
Superior.....33⅓%

File and Tool—

Nicholson File Holders and File Handles.....33⅓&40%

Fruit Jar—

Triumph Fruit Jar Holder, ₱ gross, $18.00; ₱ doz.....$2.00

Trace and Rein—

Fernald Double Trace Holder, ₱ doz. pairs.....$1.25
Dash Rein Holder, ₱ doz.....$1.25

Hones—Razor—

Pike Mfg. Co., Belgian and Swaty, 50%; German.....33⅓%

Hooks—Cast Iron—

Bird Cage, Reading.....40%
Clothes Line, Reading List.....40%
Coat and Hat, Reading.....45&20%
Coat and Hat, Wrightsville.....60&5%
Harness, Reading List.....40%

Wire—

Belt, Nos. 1 to 15....75&10@80%
Wire C. & H. Hooks..80@80&10%
Bradley Metal Clasp Wire, Coat and Hat, 75&10@80%; Ceiling..75&10@80%
Columbian Hdw. Co., Gem.....75&10%
Parker Wire Goods Co., King..75&10%
Wire Goods Co.:
Acme, 60&10%; Chief, 70&10%; Crown, 75%; Czar, 65&10%; V Brace, 75%; Czar Harness, 50%; Ceiling, 75%.

Wrought Iron—

Box, 6 in., per doz., $0.90; 8 in., $1.15.
Cotton.....doz. $1.25@$1.50
Wrought Staples, Hooks, &c.—See Wrought Goods.

Miscellaneous—

Hooks, Bench, see *Stops, Bench.*
Bush, Light, doz., $6.20; Medium, $6.75; Heavy, $7.65
Grass, best, all sizes, per doz., $2.75@$3.00
Grass, common grades, all sizes, per doz.....$1.25@$1.50
Whiffletree.....lb. 5¼@6¢
Hooks and Eyes:
Brass.....60@60&10%
Malleable Iron.....70@70&10%
Covert Mfg. Co. Gate and Scuttle Hooks.....40%
Ft. Madison Cut-Easy Corn Hooks, ₱ doz. $3.25 net
Turner & Stanton Co. Cup and Shoulder.....85&10%
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Horse Nails—

See *Nails, Horse.*

Horseshoes—

See *Shoes, Horses.*

Hose, Rubber—

Garden Hose, ¾-inch:
Competition.....ft. 6@6¼¢
3-ply Guaranteed....ft. 8½@9¢
4-ply Guaranteed....ft. 9¼@12¢
Cotton Garden, ¾-in., coupled:
Low Grade.....ft. 8@ 9¢
Fair Quality.....ft. 10@11¢

Irons—Sad—

From 4 to 10.....lb. 2½@2¾¢
B. B. Sad Irons.....lb. 3¼@3½¢
Mrs. Potts', cents per set:

	Nos. 50	55	60	65
Jap'd Caps	86	93	96	93
Tin'd Caps	91	88	1.01	98

New England Pressing..lb. 3¼@4¼¢

Bar and Corner—

Richards Mfg. Co., Bar, 60&10%; Corner.....60%

Pinking—

Pinking Irons.....doz. 00@85¢

Irons, Soldering

See *Coppers.*

Jacks, Wagons—

Covert Mfg. Co.:
Auto Screw.....30&2%; Steel, 45%
Lockport.....50%
Lane's Steel.....30&5%
Richards' Tiger Steel, No. 130...50&10%
Smith & Hemenway Co.'s.....—%

Ladder—

Richards Mfg. Co., Ladder Jacks..50%

Jointers—

Pike Mfg. Co., Saw Jointers, $7.00..40%

Kettles—

Brass, Spun, Plain.....20@25%
Enameled and Cast Iron—See Ware, Hollow.

Knives—

Butcher, Kitchen, &c.—

Foster Bros.' Butcher, &c.....30%
Wilkinson Shear & Cutlery Co....60%

Corn—

Columbian Cutlery Co., Wilcut Brand Knives and Hooks.....60%
Withington Acme, ₱ doz., $2.65; Dent, $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

Drawing—

Standard List.....80&10@—%
C. E. Jennings & Co., Nos. 45, 46, 25&7½%
Jennings & Griffin, Nos. 41, 42, 66⅔&7½%
Swan's.....66⅔@70%
Watrous.....16⅔%
L. & I. J. White.....20&5@25%

Hay and Straw—

Serrated Edge, per doz. $5.00@5.50
Iwan's Sickle Edge.....₱ doz. $9.50
Iwan's Serrated.....₱ doz. $10.00

Miscellaneous—

Farriers'.....doz. $2.60@3.55
Wostenholm's.....₱ doz. $3.00@3.25

Knobs—

Base, 2½-inch, Birch or Maple, Rubber Tip.....gro. $1.25@1.40
Carriage, Jap., Drive, all sizes, gro. 35@40¢
Door, Mineral.....doz. 65@70¢
Door, Por. Jap'd.....doz. 70@75¢
Door, Por. Nickel..doz. $2.05@2.15
Bardsley's Wood Door, Shutters, &c. 15%

Lacing, Leather—

See *Belting, Leather*

Ladders, Store, &c.—

Lane's Store.....25%
Myers' Noiseless Store Ladders....50%
Richards Mfg. Co.:
Improved Noiseless, No. 112.....50%
Climax Shelf, No. 113.....50%
Trolley, No. 109.....50%

Ladles, Molting—

L. & G. Mfg. Co., Melting and Plumbers'.....25%
P. S. & W.....40&10%
Reading.....60%

Lamps,—

Hammer's M. I. Hand.....45%

Lanterns—Tubular—

Regular, No. 0.....doz. $4.35@4.50
Side Lift, No. 0.....doz. $4.60@4.75
Hinge Globe, No. 0. doz. $4.60@4.75
Other Styles.....40@40&10%

Bull's Eye Police—

3-inch.....$3.75@4.00

Latches—Thumb—

Roggin's Latches, Jap'd, with Screws.....doz. 35@40¢

Door—

Cronk & Carrier Mfg. Co., No. 101, ₱ doz. $2.00
Richards' Bull Dog, Heavy, No. 125.....50&5%
Richards' Trump, No. 127.....$1.00

Leaders, Cattle—

Small.....doz. 50¢; large, 60¢
Covert Mfg. Co.:
Cotton, 45%; Hemp, 45%; Jute, 35%; Sisal, 20%.

Leathers, Pump—

See *Pumps.*

Lifters, Transom—

R. & E.....10%

Lines—

Wire Clothes, Nos.	*18*	*19*	*20*
100 feet	*$2.30*	*1.95*	*1.75*
75 feet	*$1.95*	*1.65*	*1.50*

Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3..40%
Solid Braided Masons'.....30%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50.....₱ gr. 20%
Masons' Lines, Shade Cord, &c.: White Cotton, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50.....20%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50.....20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft., $5.25.....20%
Turner & Stanton Co.:
Solid Braided Chalk, Masons' and Awning Lines.....40%
Clothes Lines, White Cotton....20%
Shade Cord, Cotton or Linen....20%

Locks—Cabinet—

Cabinet Locks....33⅓@33⅓@5%

Door Locks, Latches, &c.—

NOTE.—Net Prices are very often made on these goods.
Reading Hardware Co.....40%
R. & E. Mfg. Co.....10%

Padlocks—

R. & E. Mfg. Co. Wrought Steel and Brass.....75&10%

Sash, &c.—

Ives' Patent:
Crescent.....10%
Automatic Gravity Metal Sash, ₱ gro., $149.58.....10%
Window Ventilating.....10%
Pullman Patent Ventilating Lock..25%
Reading Sash Locks.....40%
Taylor Mfg. Co., Perfect Ventilating, ₱ doz.....$0.75@$1.00

Machines—Boring—

Com. Upr't, without Augers, $2.00@2.25
Com. Angl'r, without Augers, $2.25@2.50
Ford Auger Bit Co.....$22.00
Jennings', Nos. 1 and 4.....25&7½%
Millers' Falls.....5,75
Snell's, Upright, $2.65; Angular, $2.90
Swan's Improved.....40&10%

Corking—

Reisinger Invincible Hand Power... ₱ doz. $48.00

Fence—

Williams' Fence Machines....each, $5.50

Hoisting—

Moore's Anti-Friction Chain Hoist.30%
Moore's Hand Hoist, with Lock Brake.....20%
Moore's Cyclone High Speed Chain Hoist.....25%

Ice Cutting—

Chandler's.....12½%

Washing

Boss Washing Machine Co.:	Per doz.
Boss No. 1	$57.00
Boss Rotary	$57.00
Champion Rotary Banner No. 1	$57.00
Standard Champion No. 1	$50.00
Standard Perfection	$27.00
Cincinnati Square Western	$33.00
Uneeda American, Round	$33.60

Mallets—

Hickory.....45&5@50%
Lignumvitæ.....45&5@50%
Tinners' Hickory and Apple-wood.....doz. 45&5@50%

Mangers, Stable—

Swett Iron Works.....50%

Mats, Door—

Acme Flexible Steel.....50%
Elastic Steel (W. G. Co.), new list.50%

Mattocks—

See *Picks and Mattocks.*

Milk Cans—See *Cans, Milk.*

Mills, Coffee, &c.—

Enterprise Mfg. Co.:
Coffee.....20@25%
Shell and Corn.....25&10%
National list Jan. 1, 1902.....30%
Parker's Columbia and Victoria..33⅓%
Parker's Box and Side.....50&10%
Swift, Lane Bros. Co.....30%

Motors, Water—

Divine's Red Devil.....30%

$2.50	3.50	10.00	15.00	33⅓%
No. 1	2	3	4	

Lippincott's:

No.	1	2	3	4
	$2.50	3.50	10.00	15.00..33⅓%

Pike Mfg. Co., Tool and Knife Grinding.....33⅓%

Mowers, Lawn—

NOTE.—Net prices are generally quoted
Cheapest, 10-in., $2.00; advance 10¢ for each size.
Cheap, 10-in., $2.25; advance 15@20¢ for each size.
Better Grade, 10-in., $3.00; advance 25¢ for each size.

	12	*14*	*16*	*18 in.*
High Grade	*$4.50*	*4.75*	*5.00*	*5.25*

Continental.....60%
Great American.....70%
Great American Ball B'r'g, new list.70%
Quaker City.....70%
Pennsylvania.....60%
Pennsylvania, Jr., Ball Bearing.....50&10&5%
Pennsylvania Golf.....50%
Pennsylvania Horse.....33⅓&5%
Pennsylvania Pony.....40&5%
Philadelphia:
Styles M., S., C., K., T....70&10&5%
Style A, all Steel.....60&10&5%
Style E, High Wheel.....70&10&5%
Drexel and Gold Coin, special list.40%
Horse.....40&5%
Pony.....40&5%
36-in. Horse.....30&10%
Eagle Horse.....30&5%
I. X. L. Horse.....50%

Nails—

Wire Nails and Brads, Miscellaneous.....85&5@85&10%
Cut and Wire. See *Trade Report.*
Hungarian, Finishing, Upholsterers', &c. See *Tacks.*

Horse—

Nos.	6	7	8	9	10	
Anchor	23	21	20	19	18	.. ₱ lb. net, 12¢
Coleman	13	12	12	11	11	net ₱ lb
New Haven..	23	21	20	19	18	.. ₱ lb. net, 12¢
Livingston	19	18	17	16	16	.....10%
Western						₱ lb 8¼¢

Jobbers' Special Brands, per lb. 9¢

Picture—

	1½	2	2½	3 in.
Brass Hd. gro.	*.55*	*.55*	*.60*	*.70*
Por. Head, gro.	*1.10*	*1.10*	*1.10*	

Upholsters—

Brass.....30%
Plated.....30&10%

Nippers—

See *Pliers and Nippers.*

Nipples—

Standard Nipple Co.:
Wrought Pipe Nipples.....80%

Nuts—*Blank or Tapped.*

Cold Punched: Off list.
Square.....5.50@5.50¢
Hexagon.....6.00@6.10¢
Square, C., T. & R..5.80@5.90¢
Hexagon, C., T. & R. 6.60@6.70¢
Hot Pressed:
Square.....5.80¢
Hexagon.....6.30¢

Oakum—

Best.....lb. 6½¢
U. S. Navy.....lb. 6 ¢
Navy.....lb. 5 ¢
Plumbers' Spun Oakum..2¾@3 ¢

Oil—

Pike Mfg. Co., Stonoil.....40%

Oil Tanks—See *Tanks, Oil.*

Oilers—

Steel, Copper Plated.....75%
Chase or Paragon:
Brass and Copper.....50&10%
Zinc.....65&10@70%
Railroad.....60&10&10%
Malleable, Hammers' Improved, Nos. 11, 12 and 13, 10%; Old Pattern, Nos. 1, 2, 3, 4, 50%.
American Tube & Stamping Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, &c.....60@60&10%
Maple City Mfg. Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, &c.....60@60&10%

Openers—Packing Box—

Herculever, ₱ doz., $24.....30%

Can Openers—

Per doz.
Sprague, Iron Handle....30@35¢
Sprague, Wood Handle.....40¢
Sardine Scissors.....$1.75@3.00
Can and Bottle Openers, ₱ doz., net: Yankee, $0.75@$0.85; Little Gem, $0.50@$0.65; Nifty.....$0.75

Egg—

Hartigan Nickel Plate, ₱ doz., $2.00; Silver Plate, $4.00.

Packing—

Asbestos Packing, Wick and Rope, any quantity.....18@20¢

Rubber

(Fair quality goods.)
Sheet, C. I.....11@12¢
Sheet, C. O. S.....11@12¢
Sheet, C. B. S.....12@13¢
Sheet, Pure Gum.....40@45¢
Sheet, Red.....40@50¢
Jenkins' '96, ₱ lb. 83¢.....25%

Miscellaneous—

American Packing....lb. 7@10 ¢
Cotton Packing.....lb. 16@25 ¢
Italian Packing.....lb. 9@10¢
Jute.....lb. 4@4¼¢
Russia Packing.....lb. 9@10¢

Pails, Water, Well, &c.—

See *Buckets.*

Paint—

Dixon's Silica-Graphite, in 1 gal. pails and 5 gal. kegs, 25%; packages of larger size.....20%

Pans—Dripping—

Standard List...70&10@70&10&5%
Edwards, Royal Blue.....75%

Fry—

Common Lipped:

Nos.	*1*	*2*	*3*	*4*	*5*
Per doz.	*$0.75*	*0.85*	*0.95*	*1.15*	*1.30*

Refrigerator, Galva.—

Inch	*12*	*14*	*16*	*18*
Per doz.	*$1.75*	*2.25*	*2.80*	*3.15*

Paper—Building Paper

Asbestos: lb.
Roll Board or Building Felt, 6 to 30 lb., per 100 sq. ft..2½¢
Roll Board or Building Felt, 3-32 and ⅛ in., 45 to 60 lb., per 100 sq. ft.....3½¢
Mill Board, Sheet, 40 x 40 in., 1-32 to ½ in.....3¢
Per roll.
Rosin Sized Sheathing: 500 sq. ft. Light weight, 25 lbs. to roll, $8@$8¢
Medium weight, 30 lbs. to roll, 56@70¢
Heavy weight, 40 lbs. to roll, 75@78¢
Black Water Proof Sheathing, 500 sq. ft., 1 ply, 65¢; 2 ply, 85¢; 3 ply, $1.10; 4 ply, $1.25.
Deafening Felt, 9, 6 and 4½ sq. ft. to lb., ton.....$55.50
Red Rope Roofing, 250 sq. ft. per roll.....$1.75

Tarred Paper—

1 ply (roll 400 sq. ft.), ton, $34.00@$38.00
2 ply, roll 108 sq. ft.....65¢
3 ply, roll 108 sq. ft.....88¢
Slater's Felt (roll 500 sq. ft.).80¢

Sand Paper and Cloth—

Flint and Emery.....50&10%
Garnet Paper and Cloth.....25%

Parers—Apple—

Goodell Co.:

Family Bay State	₱ doz. $15.00
Improved Bay State	₱ doz. $36.00
New Lightning	₱ doz. $7.00
Turn Table '98	₱ doz. $6.00
White Mountain	₱ doz. $5.00
Bonanza Improved	each $7.50
Dandy	each $10.00
Eureka Improved	each $20.00
New Century	each $20.00
Ranger	each $30.00

Livingston Nail Co.:
Daisy ..... ℔ doz. $4.00
Little Star..... ℔ doz. $5.00
Rocking Table..... ℔ doz. $6.20
Reading Hardware Co.:
Advance ..... ℔ doz. $4.00
Baldwin ..... ℔ doz. $4.00
Reading 72..... ℔ doz. $3.25
Reading 78..... ℔ doz. $6.25

Orange—

Goodell Co., Success.....each $20.00

Potato—

Saratoga ..... ℔ doz. $7.00
White Mountain..... ℔ doz. $6.00

Picks and Mattocks—

(List Jan., 1908.)

List .....70&10@70&10&10%
Cronk's Handled Garden Mattock, ℔ doz., $3.00.....33⅓%

Pinking Irons—

See *Irons, Pinking.*

Pins, Escutcheon—

Brass .....50@50&10%
Iron, list Nov. 11, '85..60@60&10%

Pipe, Cast Iron Soil—

Standard, 2-6 in.....70@—%
Extra Heavy, 2-6 in..75&10@—%
Fittings, Standard and Heavy, 80&10@80&10&10%

Pipe, Merchant—

	Consumers, Steel. Blk.	Galv.	Carloads, Iron. Blk.	Galv.
	%	%	%	%
⅛ and ¼ in..	66	50	64	..
⅜ in.....	68	54	66	52
½ in.....	70	58	68	56
¾ to 6 in....	74	64	72	62
7 to 12 in....	71	56	69	54

Pipe, Vitrified Sewer—

Carload lots.

Standard Pipe and Fittings, 8 to 24 in., f.o.b. factory:
First-class 87½%
Second-class 90%

Pipe, Stove—

	Per 100 joints. C. L.	L. C. L.
Edwards' Nested:		
5 in., Standard Blue....	$6.25	$7.25
6 in., Standard Blue....	6.75	7.75
7 in., Standard Blue....	7.75	8.75
5 in., Royal Blue.....	7.00	8.00
6 in., Royal Blue.....	7.50	8.50
7 in., Royal Blue.....	8.50	9.50
Wheeling Corrugating Co.'s Nested:		
5 in., Uniform Color..	$5.90	$6.90
6 in., Uniform Color..	6.40	7.40
7 in., Uniform Color..	7.40	8.40

Planes and Plane Irons—

Wood Planes—

Bench, first qual.....50@50&10%
Bench, second qual...40@40&10%
Molding .....25@25&10%

Chapin-Stephens Co.:
Bench, First Quality.....30%
Bench, Second Quality.....40%
Molding and Miscellaneous.....25%
Toy and German.....30%
Union 60%

Iron Planes

Chaplin's Iron Planes.....60%
Union 60%

Plane Irons—

Wood Bench Plane Irons, list Dec. 12, '06.....25%
Buck Bros.....30%
Chapin-Stephens Co.....25%
Union 50%
L. & I. J. White.....20&5@25%

Planters, Corn, Hand—

Kohler's Eclipse..... ℔ doz. $7.50

Plates—

Felloe ..... lb. 3¾@4¢
Avery Stamping Co.:
Standard Wrot. Steel Felloe Plates in 100 lb kegs, per 100 lb, ¾-in. to 1¼-in., $4.00 net; 1¼-in. to 2-in., inclusive, $3.75 net.

Steel Pipe Hook—

Never-Break .....75&10%

Pliers and Nippers

Button Pliers....75&5@75&10&5%
Gas Burners, per doz., 5 in., $1.25 @$1.30; 6 in., $1.45 $1.50.

Gas Pipe..	7	8	10	12-in.
	$2.00	$2.25	$2.75	$3.50

Acme Nippers.....50&5%
Cronk & Carrier Mfg. Co.:
American Button.....80%
Improved Button.....75&10%
Cronk's 60%
No. 80 Linemen's.....50%
Stub's Pattern.....45%
Combination and others.....33⅓%
Heller's Farriers' Nippers, Pincers and Tools.....40&5@40&10&5%
P., S. & W. Tinners' Cutting Nippers 40%
Swedish Side, End and Diagonal Cutting Pliers.....50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds....40%

Plumbs and Levels—

Chapin-Stephens Co.:
Plumbs and Levels.....30@30&10%
Chapin's Imp. Brass Cor..40@40&10%
Pocket Levels.....30@30&10%
Extension Sights.....30@30&10%
Machinists' Levels.....40@40&10%
Disston's Plumbs and Levels....60&10%
Disston's Pocket Levels.....60&10%
Stanley's Dulex.....35%
Woods' Extension.....33⅓%

Points, Glaziers'—

Bulk and 1-lb. papers.....lb. 9¢
½-lb. papers.....lb. 9½¢
¼-lb. papers.....lb. 10¢

Police Goods—

Manufacturers' Lists...25@25&5%
Tower's 25%

Polish—Metal, Etc—

Ladd Co.:
Putzade Liquid, ℔ gro., ½ pts., $12.00; 1 pts., $20.00; 1 qts., $40.00; ℔ doz., ½ gals., $6.35; 1 gals., $12.00.
Prestoline Liquid, No. 1 (½ pt.), ℔ doz., $3.00; No. 2 (1 qu.), $5.00..40%
Prestoline Paste.....40%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ℔ doz. 50¢; ℔ gro. $4.50; ½ lb boxes, ℔ doz. $1.25; 1 lb boxes, ℔ doz. $2.25.
U. S. Liquid, 8 oz. cans, ℔ doz., $1.25.
Barkeepers' Friend Metal Polish, ℔ doz., $1.75.

Stove—

Black Eagle Benzine Paste, 5 lb cans, ℔ lb 10¢
Black Eagle, Liquid, ½ pt. cans.. ℔ doz. 75¢
Black Jack Paste, ¾ lb cans, ℔ gr. $9.00
Black Kid Paste, 5 lb can...each, $0.65
Ladd's Black Beauty Liquid, per 100 tins.....$6.75
Joseph Dixon, ℔ gr. $5.75.....10%
Dixon's Plumbago..... ℔ lb 8¢
Fireside ..... ℔ gr. $2.50
Gem, ℔ gr. $4.50.....10%
Japanese ..... ℔ gr. $3.50
Jet Black..... ℔ gr. $3.50
Peerless Iron Enamel, 10 oz. cans.. ℔ doz. $1.50

Window Polish—

Benj. P. Forbes:
Glasbright, No. 2, gal pails, ℔ doz., $24.00; each, $2.50; 1 lb cans, each .....75¢
Glasbright Powder, bbls., ℔ lb..20¢

Poppers, Corn—

1 qt. Square..doz.$0.80; gro.$8.75
1 qt. Round..doz.$0.90; gro.$10.00
1½ qt. Square..doz.$1.20; gro..$12.00
2 qt. Square..doz.$1.50; gro..$15.00

Post Hole and Tree Augers and Diggers—

See also *Diggers, Post Hole, &c.*

Posts, Steel—

Steel Fence Posts, each, 6 ft., 46¢; 6½ ft., 48¢; 7 ft., 50¢.
Steel Hitching Posts.....each $1.30

Potato Parers—

See *Parers, Potato.*

Pots, Glue—

Enameled 40%
Tinned .....30&10%

Powder—

In Canisters:
Duck, 1 lb.....each 45¢
Fine Sporting, 1 lb....each 75¢
Rifle, ¼-lb.....each 15¢
Rifle, 1 lb.....each 25¢
In Kegs:
12½-lb. kegs.....$3.50
25-lb. kegs.....$4.60
King's Semi-Smokeless:
Keg (25 lb bulk).....$6.50
Half Keg (12½ lb bulk).....$3.50
Quarter Keg (6¼ lb bulk).....$1.90
Case 24 (1 lb cans bulk).....$8.50
Half case (1 lb cans bulk).....$4.50

King's Smokeless:	Shot Gun.	Rifle.
Keg (25 lb bulk).....	$12.00	$15.00
Half Keg (12½ lb bulk)..	6.25	7.75
Quarter Keg (6¼ lb bulk)	3.25	4.00
Case 24 (1 lb cans bulk)..	14.00	17.00
Half case 12 (1 lb c. bk)..	7.25	8.75

Presses—

Fruit, Wine and Jelly—

Enterprise Mfg. Co.....20@25%

Seal Presses—

Morrill's No. 1, ℔ doz., $20.00.....50%

Pruning Hooks and Shears

See *Shears.*

Pullers, Nail, Etc.—

Cyclops 50%
Miller's Falls, No. 3, ℔ doz., $12.00.. 33⅓&10%
Morrill's No. 1, Nail Puller, ℔ doz. $20.00 .....50%
Pearson No. 1, Cyclone Spike Puller, each $30.00.....50%
The Scranton Co. Case Lots:
No. 2B (large).....$5.50
No. 3B (small).....$5.80
Smith & Hemenway Co.:
Diamond B.....70%
Giant 50%
Staple Pullers, Utica and Davis 60%
Taylor Mfg. Co., Sampson Tack. ℔ doz.....$0.40

Pulleys, Single Wheel—

Inch	1½	1¾	2	3
Awning or Tackle, doz	$0.30	.45	.60	1.05

Hay Fork, Swivel or Solid Eye, doz., 4 in., $1.25; 5 in., $1.55

Inch	2	2¼	2½
Hot House, doz..	$0.65	.85	1.20
Inch	1¼	1½	1¾	2
Screw, doz....	$0.16	.19	.23	.30
Inch	1¾	2	2¼	2½
Side, doz.....	$0.25	.40	.55	.60
Inch	1½	1¾	2	2½

Sash Pulleys—

Common Frame; Square or Round End, per doz., 1¾ and 2 in.....17@20¢

Auger Mortise, no Face Plate, per doz., 1¾ and 2 in....20@21¢
Acme, No. 35..1¾ in., 19¢; 2 in., 20½¢
American Pulley Co.:
Wrought Steel American Plain Axle .....50&10%
Wrought Steel, Eagle.....17@20¢
Top Notch, Electrically Welded, Nos. 3 and 4.....19¢
Common Sense..... ℔ doz. 20¢
Fox-All-Steel, Nos. 3 and 7, 2 in.... ℔ doz. 50%
Grand Rapids All Steel Noiseless..50%
Niagara, No. 25, 1¾ in., 19¢; 2 in.....20½¢
No. 26 Troy..1¾ in., 14½¢; 2 in., 16½¢
Star, No. 26....1¾ in., 19¢; 2 in., 20½¢
Tackle Blocks—See Blocks.

Pumps—

Cistern 60%
Pitcher Spout.....75&5@75&10%
Wood Pumps, Tubing, &c.....50%
Barnes Dbl. Acting (low list).....45%
Barnes Pitcher Spout.....80%
Contractors' Rubber Diaphragm, No. 2, B. & L. Block Co.....$16.00
Daisy Spray Pump..... ℔ doz. $6.50
Flint & Walling's Fast Mail Hand (low list).....50&5%
Flint & Walling's Fast Mail (low list) .....50&5%
Flint & Walling's Tight Top Pitcher 80%
National Specialty Mfg. Co., Measuring, Nos. 2, $6.00; 3, $5.50.....30%
Myers' Pumps (low list)..... } 50%
Myers' Power Pumps..... }
Myers' Spray Pumps..... }

Pump Leathers—

Plunger and Valve Leathers—Per gro.:

No	*1*	*2*	*3*	*4*
	$5.00	6.00	7.00	8.00

Cup Leathers—Per 100:

Inch....	2½	3	3½	4
	$5.00	7.00	9.00	12.00

} 50%

Punches—

Saddlers' or Drive, good, doz......50@75¢
Spring, single tube, good quality $1.75
Revolving (4 tubes)....*doz.*$3.50
Bemis & Call Co.'s Cast St'l Drive.50%
Morrill's Nos. 1AA, 1A, 1B, 1C, 1D, $15.00.....50%
Hercules, 1 die, each $5.00.....50%
Niagara Hollow Punches.....10%
Niagara Solid Punches.....55&10%
Tinners' Hollow, P., S. & W. Co..40%
Tinners' Solid, P., S. & W. Co.. ℔ doz., $1.44.....40&10%

Rail—Barn Door, &c.—

Sliding Door, Painted Iron, 2½@2¾¢
Sliding Door, Wrought Brass, 1⅛ in., lb., 36¢.....30%
Cronk's:
Double Braced Steel Rail..℔ ft. 2¾¢
O. N. T. Rail.....2¾¢
Griffin's:
xxx, ℔ 100 ft., 1 x 3-16 in., $3.25; 1¼ x 3-16 in., $3.75.
Hinged Hanger, ℔ 100 ft., 1 x 3-16 in., $3.50; 1¼ x 3-16 in., $4.00.
Lane's:
Hinged Track, ℔ 100 ft.....$3.45
O. N. T., ℔ 100 ft., 1 in., $3.12½; 1¼ in., $3.45; 1½ in., $4.00.
Standard, 1¼ in..... ℔ 100 ft. $4.00
Lawrence Bros.:
1 x 3-16 in., ℔ 100 ft., $7.50; 1¼ x 3-16 in., $8.75.....55&7½%
McKinney's:
Hinged Hanger Track, ℔ ft., 11¢ 60&5%
1 x 3-16 Track.....55&7½%
Myers' Stayon Track.....60&5%
Richards Mfg. Co.:
Common, 1 x 3-16 in., $3.00; 1¼ x 3-16, $3.25; 1¼ x 3-16, $3.50.
Special Hinged Hanger Rail..60&10%
Lag Screw Rail, No. 65.....50%
Gauge Trolley Track, ℔ ft., No. 31, 9¢; No. 32, 14¢; No. 33, 20¢.
No. 50.....60&10%
Nos. 61, $3.00; 62, $3.25; 63, $3.50; 64, $4.00; 45, $3.25; 46, $3.50; 49, No. 1, $3.25; 49, No. 2, $3.50.

Rakes—

NOTE.—Many goods are sold at net prices.

Fort Madison Red Head Lawn....$3.25
Fort Madison Blue Head Lawn....$2.75
Cronk's:
Steel Garden; Champion, ℔ doz., 12-tooth, $3.75; 14-tooth, $4.00; 16-tooth, $4.25; Ideal ℔ doz., 12-tooth, $3.00; 14-tooth, $3.30; 16-tooth, $3.60.
Victor, 12-tooth, $2.25; 14-tooth, $2.50; 16-tooth, $2.75.
Queen City Lawn, ℔ doz., 20 teeth, $2.85; 24, $3.00.....net
Anticlog Lawn, ℔ doz.....$4.00
Malleable Garden.....70&10%
Ideal Steel Garden, ℔ doz., 12 teeth, $15.00; 14, $16.00; 16, $18.00.....80%
Kohler's:
Jumbo Lawn, 36-tooth....℔ doz. $5.00
Lawn Queen, 20-tooth....℔ doz. $2.85
Lawn Queen, 24-tooth....℔ doz. $3.00
Paragon, 20-tooth.....℔ doz. $2.65
Paragon, 24-tooth.....℔ doz. $2.75
Steel Garden, 14-tooth....℔ doz. $2.40
Malleable Garden, 14-tooth, ℔ doz. $1.75@2.00

Rasps, Horse—

Disston's 75%
Heller Bros.'.....70&5@70&10&5%
Liveright Bros. Gold Medal.70&10@75%
McCaffrey's American Standard..... 60&10&5%
New Nicholson.....70&10@75%
See also Files.

Razors—

John Engstrom Swedish.....65%
Sharp Shaver.....60%
Fox Razors, ℔ doz., No. 42, $24.00; No. 44, $20.00; No. 82, Platina, $36.00. } Dos.

Reels, Fishing—

Hendryx:
M 6, Q 6, A 6, B 6, M 9½, M 16, Q 16, A 16, B 16, 4008, Rubber, Populo, Nickeled Populo.....20%
Aluminum, German Silv., Bronze.35%
1240 N, 124 N.....20%
3004 N, 06 N, 6 RM, G 9.....25%
4 N, 6 PN, 24 N, 28 PN.....20%
2904 P, 33½%; 2904 PN, 33½%; 0924 N, 33½%; 02084 N, 33½%; 002904 PN, 33½%; 802 N, 33½%; 986 PN, 2904 N, 974 PN.....25%
5009 PN, 5009 N.....20%
Competitor, 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR.....20%
304 P, 304 PN, 00304 P, 00304 PN.33⅓%

Registers—*List July 1, 1903.*

Japanned, Electroplated and Bronzed 70%
White Porcelain Enamel..50&10%
Solid Brass or Bronze Metal..40%

Revolvers—

Single Action.....95¢@$1.00
Double Action, except 44 cal..$2.00
Double Action, 44 caliber...$2.00
Automatic $4.00
Hammerless $4.50

Riddles, Hardware Grade

16 in.....*per doz.*$2.50@$2.75
17 in.....*per doz.*$2.75@$3.00
18 in.....*per doz.*$3.00@$3.25

Rings and Ringers—

Bull Rings—

	2	2½	3 inch.
Steel	$0.70	0.75	0.80 doz.
Copper	$1.10	1.25	1.65 doz.

Hog Rings and Ringers—

Hill's Rings, gro. boxes.$4.50@$4.50
Hill's Ringers, Gray Iron, doz... 60@75¢
Hill's Ringers, Malleable Iron, doz..80@95¢
Blair's Rings..per gro.$5.00@$5.50
*Blair's Ringers...per doz.*75@90¢

Rivets and Burrs—

Copper .....50@50&10%
Carriage, Coopers', Tinners', &c.: Black .....70&10%
Metallic Tinned.....70%

Bifurcated and Tubular—

Assorted in Boxes.

Bifurcated, per doz. boxes, pasteboard boxes, 50 count, 23@25¢; Tin boxes, 100 count, 29@32¢.
Tubular, per doz. boxes, 50 count, 29@32¢; 100 count, 51@58¢.

Rollers—

Cronk's Stay, No. 50.....$1.00
Cronk's Brinkerhoff No. 55, $0.60; No. 56, $0.75; No. 60.....$0.75
Lane's Stay.....40%
Richards' Stay:
Handy Adj. and Reversible No. 53.75¢
O. K. Adj. and Reversible No. 58.50¢
Lag Screw, Nos. 55 and 57.....50%
Underwriters', Nos. 59, 60.....50%
Favorite, No. 54.....60%

Rope—

Manila, 7-16 in. diam. and larger: Pure .....lb. 9¢
Sisal, 7-16 in. diam. and larger: Pure .....lb. 7¢
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse: Pure .....lb. 7½@7¾¢
Sisal, Tarred, Medium Lath Yarn: Pure .....lb. 6½@6¾¢
Cotton Rope: Best, ¼-in. and larger...18@20¢
Medium, ¼-in. and larger.16@17¢
Common, ¼-in. and larger..10¢
In coils, ½¢ advance.
Jute Rope: Thread, No. 1, ¼-in. and up, lb. .....5½¢
Thread, No. 2, ¼-in. and up, lb. .....5¢

Wire Rope—

Galvanized .....37½&12½%
Plain .....45&12½%

Ropes, Hammock—

Covert Mfg. Co.:
Jute, 35%; Sisal.....20%

Rules

Boxwood .....60@60&10%
Ivory .....35&10@35&10&5%
Chapin-Stephens Co.:
Boxwood 60%
Flexifold 40%
Ivory .....25@25&10%
Miscellaneous .....50@50&10%
Stephens' Combination.....55%
Stationers' .....50@50&10%
Keuffel & Esser Co.:
Folding, Wood.....35&10%
Folding, Steel.....33⅓&10%
Lufkin's Steel.....50&10%
Lufkin's Lumber.....50&10%
Upson Nut Co.:
Boxwood .....60@60&10%
Ivory .....35&10@35&10&10%

Sash Balances—

See *Balance, Sash.*

Sash Locks—See *Locks, Sash.*

Sash Weights—

See *Weights, Sash.*

Sausage Stuffers or Fillers
See *Stuffers or Fillers, Sausage.*

Saw Frames—
See *Frames, Saw.*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Saws—
Atkins':
Circular 45%
Band ..... 50@50&10%
Butcher Saws 50%
Cross Cuts 35%
One-Man Cross Cut 40%
Narrow Cross Cut 50%
Hand, Rip and Panel ..... 35&5%
Miter Box and Compass 40%
Mulay, Mill and Drag 45%
Wood Saws ..... 40&10%
Chapin-Stephens Co.:
Turning Saws and Frames ..... 30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws ..... 30&10&10%
Disston's:
Circular, Solid and Ins'ted Tooth 50%
Band, 2 to 18 in. wide 60%
Band, ¼ to 1¾ 60%
Crosscuts 45%
Narrow Crosscuts 50%
Mulay, Mill and Drag 50%
Framed Woodsaws 25%
Woodsaw Blades 25%
Woodsaw Rods, Tinned 15%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 76, 77, 8 ..... 25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination 30%
Compass, Key Hole, &c. 25%
Butcher Saws and Blades 30%
C. E. Jennings & Co.'s:
Back Saws 16⅔%
Butcher Saws ..... 25&7½%
Compass and Key Hole Saws, 33⅓&7½%
Framed Wood Saws ..... 25&7½%
Hand Saws 12½%
Wood Saw Blades ..... 33⅓&7½%
Millers Falls:
Butcher Saws ..... 15&10%
Star Saw Blades ..... 15&10%
Massachusetts Saw Works:
Victor Kitchen Saws ..... 40&10&50%
Butcher Saws Blades ..... 35@40%
Peace & Richardson's Hand Saws 30%
Simonds':
Circular Saws 45%
Crescent Ground Cross Cut Saws 30%
One-Man Cross Cuts ..... 40&10%
Gang Mill, Mulay and Drag Saws 45%
Band Saws 50%
Back Saws ..... 25@25&7½%
Butcher Saws ..... 35@35&7½%
Hand Saws ..... 25@25&7½%
Hand Saws, Bay State Brand 45%
Compass, Key Hole, &c. ..... 25@25&7½%
Wood Saws ..... 40&7½%
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws 50%

Hack Saw Blades and Frames—
Atkins' Hack Saw Blades A A A 25%
Disston's:
Concave Blades 25%
Keystone Blades 35%
Hack Saw Frames 30%
Simonds, 25%; The Best, 35%; Culley 35%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180 ..... 40&7½%
Hack Saws, Nos. 175, 180, complete, 40&7½%
Goodell's Hack Saw Blades ..... 40&10%
Griffin's Hack Saw Frames ..... 35&5&10%
Griffin's Hack Saw Blades ..... 35&5&10%
Star Hack Saws and Blades ..... 15&10%
Sterling Hack Saw Blades ..... 30&10&5%
Sterling Hack Saw Frames ..... 30&10&10%
Sterling Power Hack Saw Machines, each, No. 1, $25.00; No. 2, $30.00 ..... 10%
Victor Hack Saw Blades 20%
Victor Hack Saw Frames 40%
Whitaker Mfg. Co.:
National Hand Blades, Hand Frames, Power Blades 40%

Scroll—
Barnes, No. 7, $15 ..... 25%
Barnes' Scroll Saw Blades 40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20 ..... 20%
Lester, complete, $10.00 ..... 15&10%
Rogers, complete, $3.50 and $4.00 ..... 15&10%

Scales—
Union Platform, Plain ..... $2.10@2.20
Union Platform, Stpd ..... $2.20@2.30
Chatillon's:
Eureka 25%
Favorite 40%
Grocers' Trip Scales 50%
The Standard Portables 40%
The Standard R. R. and Wagon ..... 50&10%

Scrapers—
Box, 1 Handle ..... doz. $1.85@2.10
Box, 2 Handle ..... doz. $2.35@2.50
Ship ... Light, $2.00; Heavy, $4.50
Chapin-Stephens Co., Box ..... 30@30&10%
Richards Mfg. Co., Foot 60%

Screws—Bench and Hand
Bench, Iron, doz., 1 in., $2.50@2.75; 1¼, $3.00@3.25; 1¼, $3.50@3.75
Bench, Wood ..... 20@20&10%
Hand, Wood ... 70&10@70&10&10%
Chapin-Stephens Co., Hand ..... 70@70&10&2½%

Coach, Lag and Hand Rail—
Lag, Cone Point ..... 80&10@80&10&5%
Coach, Gimlet Point ..... 80@80&10%
Hand Rail ..... 70&10@75%

Jack Screws—
Standard List ..... 70&10@75%
Millers Falls ..... 50&10&10%
Swett Iron Works ..... 70@75%

Machine—
Cut Tread, Iron, Brass or Bronze:
Flat Head or Round Head, 50@50&10%
Fillister Head ..... 40@40&10%
Rolled Thread, F. H. or R. H., Iron ..... 75&10%
F. H. or R. H., Brass, Nos. 8 to 14 ..... 65&10%

Set and Cap—
Set (Iron) ..... 75&10&7½%
Set (Steel), not advance over Iron 25%
Sq. Hd. Cap ..... 70&10&7½%
Hex. Hd. Cap ..... 70&10&7½%
Rd. Hd. Cap ..... 50&7½%
Fillister Hd. Cap ..... 60&7½%

Wood—
List July 23, 1903.
Flat Head, Iron ..... 87½&5@ .. %
Round Head, Iron ..... 85&5@ .. %
Flat Head, Brass ..... 80&5@ .. %
Round Head, Brass ..... 77½&5@ .. %
Flat Head, Bronze ..... 75&5@ .. %
Round Head, Bronze ..... 72½&5@ .. %
Drive Screws ..... 87½&5@ .. %

Scroll Saws—
See *Saws, Scroll.*

Scythes— *Per doz.*
Grass, No. 1, Plain $7.00
Clipper, Bronzed Webb $7.25
No. 3 Clipper, Pol'd Webb $7.50
No. 6 Clipper and Solid Steel $7.75
Bush, Weed and Bramble, Nos. 11, 12 and 13 ..... $7.25
Grain, No. 1 ..... $9.00@9.50
Bronzed Webb, No. 1 ..... $9.25@9.75
Nos. 3 and 4 Clipper, Grain, $9.50@10.00
Solid Steel, No. 6 ..... $10.00@10.50

Seeders, Raisin—
Enterprise ..... 25@30%

Sets— Awl and Tool—
Fray's Tool Handles, Nos. 1, $12; 2, $16; 3, $12 ..... 50%
Millers Falls Adj. Tool Handles, No. 1, $12; No. 4, $12; No. 5, $18 ..... 20&10%

Garden Tool Sets—
Ft. Madison Three Plows, Hoe, Rake and Shovel ..... ℔ doz. sets $9.00

Sets, Nail—
Octagon ..... gro. $3.50@3.75
Buck Bros. 27½%
Mayhew's ..... ℔ gro. $9.00
Snell's Corrugated, Cup Pt. ..... 40&10%
Snell's Knurled, Cup Pt. ..... 40&10%
Victor Knurled, Cup Pt. ..... ℔ gro. $7.50

Rivet—
Regular list ..... 75@75&10%

Saw—
Atkin's:
Criterion 40%
Adjustable 40%
Disston's Star, Monarch and Triumph 30%
Morrill's No. 1 ..... $15.00
Nos. 3 and 4, Cross Cut $20.60
No. 5, Mill $30.00
Nos. 10, 11, 95 ..... $15.60
No. 1 Old Style $10.00
Special $16.25
Giant Royal Cross Cut ..... ℔ doz. $7.50
Royal, Hand ..... ℔ doz. $4.50
Taintor Positive ..... ℔ doz. $6.75

Shaving—
Fox Shaving Sets, No. 30 ..... ℔ doz., net, $24.00
Smith & Hemenway Co.'s 75%

Sharpeners, Knife—
Pike Mfg. Co.:
Fast Cut Pocket Knife Hones, ℔ doz. $1.50
Mounted Kitchen Sand Stone, ℔ doz. $1.50
Natural Grit Carving Knife Hones, ℔ doz. $3.00
Quick Cut Emery Carving Knife Hones, ℔ doz. $1.50
Quick Edge Pocket Knife Hones, ℔ doz. $2.50

Skate—
Smith & Hemenway Co., Eureka 50%

Shaves, Spoke—
Iron ..... doz. $1.25
Wood ..... doz. $2.00
Bailey's (Stanley R. & L. Co.) 45%
Chapin-Stephens Co. ..... 30@30&10%
Goodell's, ℔ doz. $9.00 ..... 15&10%

Shears—
Cast Iron .. 7 8 9 in.
Best ... $16.00 18.00 20.00 gro.
Good ... $13.00 15.00 17.00 gro.
Cheap .. $5.00 6.00 7.00 gro.
Straight Trimmers, &c.:
Best quality Jap ..... 70&10&10%
Best quality Nickel ..... 60&10&10%
Tailors' Shears ..... 40&10&10%
Acme Cast Shears ..... 40@40&5%
Heinisch's Tailor's Shears 10%
National Cutlery Co.'s Nickel Plated, 60&10%; Japan Handles ..... 70&10%
Wilkinson Shear & Cutlery Co.:
Sheep, 1900 list ..... 30&10&5%
Grass ..... 50&10%
Horse or Mule ..... 50&10%
J. Wiss & Sons Co.:
Best Quality Jap'd ..... 60&10%
Best Quality Nickeled ..... 50&10%
Tailors' 25%

Tinners' Snips—
Steel Blades ..... 20&5@20&10%
Steel Laid Blades ..... 40&10@50%
Acme Cast Snips ..... 40@45&5%
Forged Handles, Steel Blades, Berlin 50%
Heinisch's Snips 40%
Jennings & Griffin Mfg. Co.'s 6½ to 10 in. ..... 33⅓&7½%
National Cutlery Co.'s Forged Steel 50%
Niagara Snips 40%
P. S. & W. Forged Handles, 25%; W. R. W. 50%
J. Wiss & Sons Co.:
Wiss Forged Steel 25%

Pruning Shears—
Cronk's Hand Shears 33⅓%
Cronk's Wood Handle Shears 33⅓%
Disston's Combined Pruning Hook and Saw, ℔ doz, $18.00 ..... 25%
Disston's Pruning Hook only, ℔ doz., $12.00 ..... 25%
J. T. Henry Mfg. Co.:
Pruning Shears, all grades 40%
P. S. & W. Co. ..... 40&10%
Columbian Cutlery Co.:
Hedge, Wilcut Brand ..... 60&10%
Lawn and Border, Wilcut Brand, 60&10%

Sheaves—Sliding Door—
Reading 40%
R. & E. list 15%

Sliding Shutter—
Reading list 40%
R. & E. list 15%

Shells—Shells, Empty—
Brass Shells, Empty:
Climax, 10 and 12 gauge ..... 60&5%
Club, Rival, 65&5%; First Quality, 60&5%
Paper Shells, Empty:
New Rapid, 10, 12, 16 and 20 gauge, 25&10%
Climax, 10 and 12 gauge; Acme and Magic, 10, 12, 16 and 20 gauge; Ideal, 10, 12, 16 and 20 gauge; Leader grade ..... 25&5%
Union, League, 10 and 12 gauge, Rival Grade 25%
New Climax, Defiance, 10, 12, 14, 16 and 20 gauge; Climax, 14, 16 and 20 gauge 20%
Challenge, Monarch, 10, 12, 16 and 20 gauge; League, Union, 14, 16 and 20 gauge; Repeater Grade 20%

Shells, Loaded—
Loaded with Black Powder 40%
Loaded with Smokeless Powder, medium grade ..... 40&5%
Loaded with Smokeless Powder, high grade ..... 40&10&10%
Union Metallic Cartridge Co.:
New Club, Black Powders 40%
Nitro Club, Smokeless Powders ..... 40&5%
Arrow, Smokeless Powders ..... 40&10&10%
Winchester:
Smokeless Repeater Grade ..... 40&5%
Smokeless Leader Grade ..... 40&10&10%
Black Powder 40%

Shingles, Metal— Per Sq.

	Painted.	Galv.
Edwards Mfg. Co.:		
14 x 20	$1.25	$6.00
10 x 14	4.50	6.25
7 x 10	4.75	6.50
Wheeling Corrugating Co.:		
Dixie, 14 x 20 in.	$4.05	$5.05
Dixie, 10 x 14 in.	4.25	5.45
Dixie, 7 x 10 in.	5.25	6.70

Shoes, Horse, Mule, &c.—
F.o.b. Pittsburgh:
Iron ..... per keg. $4.10
Steel ..... per keg. $3.85
Burden's, all sizes ..... ℔ keg $3.90

Shot—
25-lb. bag.
Drop, up to B $1.80
Drop, B and larger 2.05
Buck 2.05
Chilled 2.05
Dust 2.30

Shovels and Spades—
Association List, Nov. 15, 1902 ..... 40%
Avery Stamping Co. 40%

Snow Shovels—
Long Handle ..... $3.25@$3.50
Wood and Mall, D Handle, $3.75@$4.00

Sieves and Sifters—
Hunter's Imitation, gro $9.50
Hunter's Genuine, per gro $12.00

Sifters, Ash—
Acme Ball Bearing Sales Co., Acme Automatic Ash Sifter, each, $3.25; ℔ doz. $39.00

Sieves, Seamless Metallic

	Per dozen.			
Mesh	*14*	*16*	*18*	*20*
Iron Wire	*$1.05*	*1.05*	*1.10*	*1.20*
Tinned Wire	*$1.15*	*1.15*	*1.20*	*1.30*

Sieves, Wooden Rim—
Nested, 10, 11 and 12 Inch.
Mesh 18, Nested ..... doz. $0.90@0.95
Mesh 20, Nested ..... doz. $1.00@1.05
Mesh 24, Nested ..... doz. $1.30@1.40

Sinks, Cast Iron—
Painted, Standard list:
12 x 12 to 22 x 36 in 60%
20 x 24 to 24 x 50 in 50%
24 x 60 to 24 x 120 in 30%
Barnes' low list 60%
NOTE.—There is not entire uniformity in lists used by jobbers.

Skeins, Wagon—
Cast Iron ..... 70@75&10%
Steel ..... 40@45%

Slates, School—
Factory Shipments.
"D" Slates ..... 50@50&10%
Eureka, Unexcelled Noiseless .. 60&7 tens.
Victor A, Noiseless .. 60&4 tens &5%

Slaw Cutters—See *Cutters.*

Snaps, Harness—
German ..... 40@40&10%
Covert Mfg. Co.:
Derby, 25%; Yankee, 30&2%; Yankee Roller, 30&2%
High Grade, 40%; Trojan 40%
Jockey 25%

Snaths—
Scythe 60%

Snips, Tinners—See *Shears.*

Spoons and Forks—
Silver Plated—
Good Quality ..... 50&10@60&5%
Cheap ..... 60@60&10%
International Silver Co:
1847 Rogers Bros. ..... 40&10%
Rogers & Bro., William Rogers' Eagle Brand ..... 50&10%
Anchor, Rogers Brand 60%
Wm. Rogers & Son ..... 60&10%

Miscellaneous
German Silver ..... 60@60&5%

Tinned Iron—
Teas ..... per gro. 50@55¢
Tables ..... per gro. $0.90@$1.00
Atlas Mfg. Co.:
Tea Spoons, ℔ gro. ..... 50¢@55¢
Table Spoons, ℔ gro. ..... $0.90@$1.00

Springs— Door—
Bardsley's Spring and Check 40%
Chicago (Coil) ..... 40&10%
Gem (Coil) 20%
Pullman Door and Gate 10%
Reliance (Coil) ..... 40&10%
Star (Coil) 35%
Torrey's Rod, 39 in. ..... ℔ doz. $1.00

Carriage, Wagon, &c.—

	Per 100 lb.
1¼ in. and Wider:	
Black	*$4.75@$5.00*
Half Bright	*$4.75@$5.00*
Bright	*$5.25@$5.50*

Painted Seat Springs:
1½ x 2 x 26 .... per pair. 45@47¢
1½ x 3 x 28 .... per pair. 68@71¢

Sprinklers, Lawn—
American Foundry & Mfg. Co.:
Cactus, 65%; Japanese, 70%; National, ℔ doz. $12.00
Enterprise ..... 25@30%
Philadelphia No. 1, ℔ doz, $12; No. 2, $15; No. 3, $20 ..... 30%

Squares—
Nickel plated .. } List Jan. 5, 1900.
Steel and Iron . } 80@80&5%
Rosewood Hdl. Try Square and T-Bevels ..... 60&10&10@70%
Iron Hdl. Try Squares and T-Bevels ..... 40&10@40&10&10%
Disston's Try Squares and Bevels, Rosewood Handle, 60 & 10%; Iron Stock and Bevel 15%

Squeezers, Lemon
Wood, Porcelain Lined:
Cheap ..... doz. $1.00
Good Grade ..... doz. $1.25
Tinned Iron ..... doz. $0.75@1.00
Iron, Porcelain Lined ... doz. $1.75
Victor, ℔ gro. $9.00

Staples—
Barbed Blind ..... 85&5@85&10%
Electricians' ..... 80&10&10@85%
Fence Staples, Polished, $2.05; Galvanized $2.35
Poultry Netting Staples ..... per lb. 3¼@3½¢

Steels, Butchers'—
Dick's 30%
Foster Bros. 30%

Steelyards— .... 30@30&10%

Stocks and Dies—
Blacksmiths' ..... 50@50&10%
Curtis Rev'ble Ratchet Die Stock 25%
Derby Screw Plates 25%
Green River 25%
Lightning Screw Plate 25%
Little Giant 25%
Reece's New Screw Plate 25%

Stoners, Cherry—
Enterprise ..... 25@30%

Stones, Axe—
Pike Mfg. Co., Axe Stones (all kinds) 33⅓%

Glass Cutters' Stones—
Pike Mfg. Co., Glass Cutters' Stones and Supplies 40%

Stones, Oil, &c.—
Pike Mfg. Co., 1907 list: ℔ lb.
Arkansas St. No. 1, 3 to 5½ in. $2.80
Arkansas St. No. 1, 5½ to 8 in. $3.50
Arkansas Slips No. 1 ..... $1.00
Lily White Washita, 4 to 8 in. 60¢
Rosy Red Washita, 4 to 8 in. 60¢
Washita St., Extra, 4 to 8 in. 50¢
Washita St., No. 1, 4 to 8 in. 40¢
Washita St., No. 2, 4 to 8 in. 25¢
Lily White Slips ..... 90¢
Rosy Red Slips ..... 90¢
Washita Slips, Extra ..... 80¢
Washita Slips, No. 1 ..... 70¢
Washita Slips, No. 2 ..... 40¢
India Oil Stones (entire list) .. 33⅓%
Quickcut Emery and Corundum Oil Stone, Double Grit 40%
Quickcut Emery and Corundum Axe Stone, Double Grit 33⅓%
Quickcut Emery Rubbing Bricks .. 40%
Hindostan No. 1, R'g'lar. ℔ lb 8¢
Hindostan No. 1, Small .. ℔ lb 10¢
Turkey Oil Stones, Extra, 5 to 8 in. ..... ℔ lb 80¢
Queer Creek Stones, 4 to 8 in. 20¢
Queer Creek Slips ..... 40¢
Sand Stone ..... 6¢

Scythe Stones—

Pike Mfg. Co., 1907 list:
Black Diamond S. S. ℔ gro. $12.00
Lamoille S. S. ℔ gro. $11.00
White Mountain S. S. ℔ gro. $9.50
Green Mountain S. S. ℔ gro. $7.00
Extra Indian Pond S. S. ℔ gro. $8.00
No. 1 Indian Pond S. S. ℔ gro. $7.50
No. 2 Indian Pond S. S. ℔ gro. $5.00
Leader Red End S. S. ℔ gro. $5.00
Quick Cut Emery ℔ gro. $10.00
Pure Corundum ℔ gro. $18.00
Crescent $7.00
Emery Scythe Rifles, 2 Coat. $8.80
Emery Scythe Rifles, 3 Coat. $11.00
Emery Scythe Rifles, 4 Coat. $13.20
Balance of 1907 list 33⅓%
Lectro (Artificial), ℔ gro., $12.00 33⅓%
$12.00 33⅓%
Lightning (Artificial), ℔ gro., $18.00 33⅓%

Stoppers, Bottle—

Victor Bottle Stoppers ℔ gro. $9.00

Stops— Bench—

Millers Falls 15&10%
Morrill's, ℔ doz., No. 1, $10.00 50%
Morrill's, No. 2, $12.50 50%

Door—

Chapin-Stephens Co. 50@50&10%

Plane—

Chapin-Stevens Co. 20%

Straps— Box—

Acme Embossed, case lots 20&10&10%
Cary's Universal, case lots 20&10&10%

Stretchers, Carpet—

Cast Iron, Steel Points . . doz. 55¢
All Steel Socket . . . doz. $2.00@2.25
Excelsior Stretcher and Tack Hammer Combined, ℔ doz., $6.00 20%

Stuffers, Sausage—

Enterprise Mfg. Co., Stuffers and Lard Presses 25@25&7½%
National Specialty Co., list Jan. 1, 1902 30&5%
P., S. & W. Co. 40&10&5%

Sweepers, Carpet— Per doz.—

Bissell Carpet Sweeper Co.:
Cyco Bearing Superba, $36.00; Triumph, $33.00; Parlor Queen, $30.00; Elite, $29.00; Boudoir, $27.00; American Queen, $27.00; Ideal, $25.00; Gold Medal, $24.00; Primier, $24.00; Prize, $24.00; Welcome, $24.00; Grand Rapids, Nickel, $24.00; Japan, $22.00; Crystal, $36.00; Grand, $36.00; Parlor Grand, $48.00; Club, $54.00; Hall, $60.00; Standard Nickel, $22.00; Standard Japan, $20.00; Crown Jewel, Nickel, $21.00; Crown Jewel, Japan, $18.00; Junior, Nickel, $22.00; Junior, Japan, $20.00.

NOTE.—Rebates: 50c per dozen on three dozen lots; $1 per dozen on five-dozen lots; $2 per dozen on ten-dozen lots.

Tacks, Finishing Nails, &c.

American Carpet Tacks . . . 90&10%
American Cut Tacks . . . . . 90&10%
Swedes' Cut Tacks . . . . . 90&10%
Swedes' Upholsterers' . . . . 90&50%
Gimp Tacks . . . . . 90&50%
Lace Tacks . . . . . 90&50%
Trimmers' Tacks . . . . . 90&10%
Looking Glass Tacks 65%
Bill Posters' and Railroad Tacks . . . . . 90&50&10%
Hungarian Nails . . . . . 80&20%
Finishing Nails 70%
Trunk and Clout Nails . . . 80&10%

NOTE.—The above prices are for Straight Weights.

Miscellaneous—

Double Pointed Tacks, 90@6 tens@—%
See also Nails, Wire.

Tanks, Oil and Gasoline—

Wilson & Friend Co.:

Gal.	Gasoline	Oil
30	$2.75	$3.00
60	$3.50	$4.00
110	$5.00	$5.75

Tapes, Measuring—

American Asses' Skin . . . 50@—%
Patent Leather . . . . . 25@30&5%
Steel . . . . . 33⅓&5%
Chesterman's . . . . . 25@25&5%
Keuffel & Esser Co.:
Favorite, Ass Skin 40&10@50%
Favorite, Duck and Leather 25&5@25&10%
Metallic and Steel, lower list, 35@35&5%; Pocket, 35@35&5%.
Lufkins:
Asses' Skin 40&10@50%
Metallic 30@30&5%
Patent Bend, Leather 25&5@25&10%
Pocket 40@40&5%
Steel 33⅓@35%
Wiebusch & Hilger:
Chesterman's Metallic, No. 34L, etc. 25%
Chesterman's Steel, No. 1036L, etc. 35%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ⅝-inch and larger, per 100 lb . . . . . $2.55@$2.80

Thermometers—

Tin Case, Cabinet, Flange, Dairy, &c . . . . . 30@35%

Ties, Bale—Steel Wire—

Single Loop . . . . . 82½&10%
Monitor, Cross Head, &c. 70&2½%

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tire Benders, Upsetters, &c.

See *Benders and Upsetters, Tire.*

Tools—Coopers'—

L. & I. J. White 20@20&5%

Haying—

Myers' Hay Tools 50%

Ice Tools—

Gifford-Wood Co. 15%

Miniature—

Smith & Hemenway Co.'s, Davidson, ℔ doz., Nickel Plated, $1.50; Gold Plated $2.00

Saw—

Atkins' Cross Cut Saw Tools 35&5%
Simond's Improved 33⅓%
Simonds' Crescent 30%

Ship—

L. & I. J. White 25%

Torches—

Hammers, Engine, ℔ doz. $4.50

Transom Lifters—

See *Lifters, Transom.*

Traps—Fly—

Balloon, Globe or Acme, doz., $1.15@$1.25; gro. . . . $11.50@12.00
Harper, Champion or Paragon, doz., $1.25@1.40; gro. $13.00@13.50

Game—

Imitation Oneida . . . . .75@10%
Newhouse 50&5%
Hawley & Norton 65&10%
Victor 75@75&10%
Oneida Community Jump 70&5%
Stop Thief 60%
Tree Trap 60%
Hector 75@75&10%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes, 12¢
Mouse, Round or Square Wire, doz. 85@90¢
Marty French Rat and Mouse Traps (Genuine), ℔ doz.:

	Crate lots.	Small lots.
No. 1, Rat	$11.50	$14.50
No. 3, Rat	$5.75	$6.50
No. 3½, Rat	$4.70	$5.25
No. 5, Mouse	$2.25	$3.00

Animal Trap Co.:
Out o' Sight, Mouse, ℔ doz. $0.60
Out o' Sight, Rat, ℔ doz. 1.20
Easy Set, Mouse, ℔ doz. .35
Easy Set, Rat, ℔ doz. .85
Out o' Sight Chockers, ℔ doz. holes .12
Out o' Sight, Tin, 5-hole, ℔ doz. traps .75

Trowels—

Disston Brick and Pointing 25%
Disston Plastering 20%
Disston "Standard Brand" and Garden Trowels 30%
Kohler's Steel Garden Trowels, ℔ gro., 5 in., $4.80; 6 in., $6.00.
Never-Break, Forged Steel Garden Trowels, in bulk, net ℔ gro. $5.50
In 1 doz. boxes ℔ gro. $6.00
Woodrough & McParlin, Plastering 25%

Trucks, Warehouse, &c.—

B. & L. Block Co.:
New York Pattern 50&10%
Western Pattern 60&10%
Handy Trucks ℔ doz. $16.00
Grocery ℔ doz $15.00
McKinney Trucks each, net $10.00
Model Stove Trucks ℔ doz $18.50

Tubs, Wash—

M'f'gr's list, price per gross.
No. 0 1 2 3
Galvanized . $67 $79 $89 $99 10&7½&5%

Twine, Miscellaneous—

Flax Twine:
No. 9, ¼ and ½-lb. Balls . 21@23¢
No. 12, ¼ and ½-lb. Balls . 19@21¢
No. 18, ¼ and ½-lb. Balls . 16@18¢
No. 24, ¼ and ½ -lb. Balls . 15½@17½¢
No. 36, ¼ and ½-lb. Balls . 15@17¢
Chalk Line, Cotton ½-lb. Balls . . . . . 21@29¢
Cotton Mops, 6, 9, 12 and 15 lb. to doz. . . . . 8½@19¢
Cotton Wrapping, 5 Balls to lb., according to quality . 13½@19¢
American 2-Ply Hemp, ¼ and ½-lb. Balls . . . . . 12½@15¢
American 3-Ply Hemp, 1-lb. balls . . . . . 13½@16¢
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine) . . 7½@9¢
India 3-Ply Hemp, 1-lb. Balls 7½@9¢
India 2-Ply Hemp, 1½-lb. Balls, 7@8½¢
2, 3, 4 and 5-Ply Jute, 1½-lb. Balls . . . . . 9@11¢
Mason Line, Linen, ½-lb. Bls. 47¢
No. 264 Mattress, ¼ and ½ lb. Balls, according to quality. 30@60¢
Wool, 3 to 6 ply . . . . B 6¢; A 7½¢

Vises—

Solid Box . . . . . 50&5@50&10&5%

Parallel—

Athol Machine Co.:
Simpson's Adjustable 40%
Standard 40%
Amateur 25%
Columbian Hdw. Co., 40&5%:
Slide 65%
Fisher & Norris Double Screw, net, each, Nos. 2, $10.50; 3, $16.00; 4, $20.50; 5, $27.00; 6, $32.00.
Fulton Mach. & Vise Co.:
F. & R. Double Swivel Machinists' 40%
Star, Solid Jaw, Machinists' 40%
Hollands':
Machinists' 40@40&5%
Keystone 65&5@70%
Lewis Tool Co.:
Adjustable Jaw 30%
Monarch, 50%; Solid Jaw 50%
Massey Vise Co.:
Clincher 40%
Parallel Bar 15%
Perfect, 15%; Lightning Grip 15%
Merrill's 25%
Millers Falls Oval Slide Pattern 60&10%
Parker's:
Victor, 20@25%; Regulars 20@25%
Vulcan's 40@45%
Combination Pipe 55@60%
Prentiss 20@25%
Rock Island 25%
Snediker's X. L. 33⅓%
Stephens' 33⅓%

Saw Filers

Disston's D 3 Clamp and Guide, ℔ doz., $24.00, 30%; Clamps 30%
Perfection Saw Clamps, ℔ doz. $4.50
Reading 60%

Wood Workers—

Fulton Mach. & Vise Co.:
F. & R. Double Swivel Coachman's 40%
Star Solid Jaw Woodworkers' 60%
Massey Vise Co.:
Lightning Grip, 15%; Perfect 15%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Miscellaneous—

Fulton Machine & Vise Co., Combination Pipe 70%
Holland's Combination Pipe. 60@60&5%
Massey's Quick Action Pipe 40%
Parker's Combination Pipe:
87 Series, 60%; 187 Series, 60&5%; No. 870, 40%.
Rock Island Pipe 25%

Wads— *Price per M.*

B. E., 11 up . . . . . 60¢
B. E., 9 and 10 . . . . . 70¢
B. E., 8 . . . . . 80¢
B. E., 7 . . . . . 80¢
P. E., 11 up $1.00
P. E., 9 and 10 . . . . . 1.25
P. E., 8 . . . . . 1.50
P. E., 7 . . . . . 1.50
Dis. 15%
Ely's B. E., 11 and larger. $1.70@1.75
Ely's P. E., 12 to 20 . . . . $3.00@3.25

Ware, Hollow—

Cast Iron, Hollow—

Stove Hollow Ware:
Enameled . . . . . 45&10%
Ground . . . . . 50&5%
Plain or Unground 60%
Country Hollow Ware, per 100 lbs . . . . . $2.75@$3.00
White Enameled Ware:
Maslin Kettles . . . . . 65&10%
Covered Wares:
Tinned and Turned . . . . . 35&10%
Enameled . . . . . 45&10%
See also *Pots, Glue.*

Enameled—

Agate Nickel Steel Ware 33⅓%
El-an-ge 60&10%
Iron Clad Ware 70&10%
Lava and Volcanic, Enameled 40&10%

Tea Kettles—

Galvanized Tea Kettles:

Inch	6	7	8	9
Each	*45¢*	*50¢*	*55¢*	*65¢*

Steel Hollow Ware—

Avery Stamping Co.:
Never-Break Spiders and Griddles 65&10%
Steel Kettles, Maslins Scotch Bowls, Tin'd 60%
Steel Stew Pans, Stew Pots, etc. Porcelained 50%
Cleveland Stamping & Tool Co.:
Solid Steel Spiders and Griddles 65&5%
Solid Steel Kettles 60&5%

Warmers, Foot—

Pike Mfg. Co., Soapstone 40@40&10%

Washboards—

No.	℔ doz.
800—Brass King, Single Surface, Open Back	$2.80
862—White Hen, Spiral Grimp Glass	$3.35
964—Royal Blue Enamel, Single Surface, Ventilated Back	$3.35
172—Our Best, Single Zinc, Soap Drainer	$3.35
722—Soap Saver, Single Zinc, Iron Top	$3.35
100—Northern Queen, Single Zinc, Perforated, Open Back	$3.00
134—Universal, Single Zinc, Extra Family Size, Ventilated Back	$2.80
760—Banner Globe, Single Zinc, Ventilated Back	$2.25
57—Peerless, Double Zinc, Spring Protector	$3.70
56—Red Cross, Double Zinc, Swing Protector	$3.60
17—North Star, Solid Zinc, Swing Protector	$3.60
797—Jewel, Single Zinc, Pail Size.	$1.25

Washers—Leather, Axle—

Solid . . . . . 90@90&10%
Patent . . . . . 90@90&5%
Coil: ⅞ 1 1½ 1¼ inch.
9¢ 10¢ 11¢ 14¢ per box.

Iron or Steel—

Size bolt . . . . 5-16 ⅜ ½ ⅝ ¾
Washers $4.65 3.75 2.45 2.25 2.05
The above prices are based on $6.75 off list.
In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ½¢ to list.
Avery Stamping Co.:
Standard, in 200 lb kegs, $6.00 ℔ 100 lb. discount; in 100 lb kegs, add 10¢ net ℔ 100 lb; in 5 or 10 lb boxes, add 50¢ net ℔ 100 lb; in 1 lb boxes, add $1.00 net ℔ 100 lb.

Cast Washers—

Over ½-inch, barrel lots, per lb. 1½@1¾¢

Wedges—

Oil Finish . . . . . lb., 2¼@2¾¢

Weights—Hitching—

Covert Mfg. Co. 30&2%

Sash—

Per net ton, f.o.b. factory:
Eastern District . . . . $20.00@—
Western and Central Districts . . . . . $19.00@$21.00

Wheels, Corundum and Emery—

Pike Mfg. Co., Corundum, 65%; Emery 75%

Well—

8-in., $2.00; 10-in., $2.30; 12-in., $3.00; 14-in., $4.45.

Wire and Wire Goods—

Bright and Annealed:
6 to 9 . . . . . 72&10&7½%
10 to 18 . . . . . 72½&10&10%
19 to 26 . . . . . 75&10&10&2½%
27 to 36 . . . . . 77½&10&7½%
Galvanized:
6 to 9 . . . . . 72½&10%
10 to 14 . . . . . 72½&10&5%
15 to 16 . . . . . 72½&10&5%
17 to 18 . . . . . 72½%
19 to 26 . . . . . 70&5&2½%
27 to 36 . . . . . 65&10&10%
Coppered:
6 to 9 . . . . . 65&10&10%
10 to 14 . . . . . 70&10&5%
15 to 18 . . . . . 65&10&10&10%
19 to 26 . . . . . 70&5&2½%
27 to 36 . . . . . 72½&10&10&2½%
Tinned:
6 to 18 . . . . . 67&10&10%
Brass . . . . . 15½¢ lb., base
Copper . . . . . 15¼¢ lb., base
Cast Steel Wire 50%

Spooled Wire—

Annealed and Tinned . 75@75&10%
Brass and Copper . . . . 70@70&10%
Retailers' Assortments, per box, $1.90@$2.10
Wire Clothes Line, See Lines.
Wire Picture Cord, see Cord.

Bright Wire Goods—

Steel Wire Goods . 90&10@90&10@90&10%
Brass Wire Goods, 90&10@90&10@90&10%
Brass Cup and Shoulder Hooks, 85&10%

Wire Cloth and Netting—

Galvanized Poultry Netting, 80&2½@80&7½%
Painted Screen Cloth, 100 ft., $1.35
Standard Galv. Hardware Grade: 100 ft. rolls, 2½ to 48 in. wide, Per 100 sq. ft.
Nos. 2, 2½ and 3 Mesh $2.75
Nos. 4 and 5 Mesh $3.00
No. 6 Mesh $3.25
Nos. 7 and 8 Mesh $3.75

Wire, Barb—See *Trade Report*

Wrenches—

Agricultural, 80&10&5@80&10&10%
Alligator or Crocodile . 70&10@75%
Baxter Pattern S Wrenches, 70&5@70&10%
Drop Forged S . . . . . 45@45&5%
Acme 60&10%
Alligator Pattern, 70%; Bull Dog 70%
Bemis & Call's:
Adjustable S, 40&5%; Adjustable S Pipe, 40&5%; Briggs Pattern, 40%; Combination Bright, 50%.
Steel Handle Nut 50&5%
Combination Black 50&5%
Merrick Pattern 50&5%
Boardman's 40%
Coes' Genuine Knife Hdl. 40&10&5&5%
Coes' Genuine Steel Hdl. 40&10&5&5%
Coes' Genuine Key Model. 40&10&5&5%
Coes' Genuine Hammer Handle 40&10&5&5%
Coes' "Mechanics'" 40&10&10&5&5%
Donohue's Engineer 40&10%
Eagle 70%
Gem Pocket 30%
Hercules 70%
W. & B. Machinist:
Case lots 50&10%
Less than case lots 50%
W. & B. Railroad Special:
Case lots 50%
Less than case lots 40&10&5%
Solid Handles, P., S. & W. 50&10%; full cases 50&10&5%
Standard Nipple Mfg. Co.:
Duplex Chain 50%
Uwanta Wrench Co.:
Uwanta Special, Iron Handle 40&10&5%
Other Wrenches 50%
Vulcan and Agrippa Chain 50%
Whitaker Machinists' 50&10%
Wizard Adjustable Ratchet 50%

Fruit Jar—

Bent, P. Forbes, Triumph, ℔ gro., $7.50; per doz. $0.90

Wrought Goods—

Staples, Hooks, &c., list March 17, '02 . . . . . 90@—%

Zinc— *(Cask lots at mill.)*

Sheet . . . . . per 100 lb., $7.00

CURRENT METAL PRICES.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from store—

Refined Iron:

1 to 1⅞ in. round and square; 1½ to 4 in. x ⅜ to 1 in.	₩ ℔ 1.80¢
1½ to 4 in. x ¼ to 5-16	₩ ℔ 2.00¢
Rods—⅜ and 11-16 round and square	₩ ℔ 2.00¢

Angles:	Cts ₩ ℔
3 in. x ¼ in. and larger	2.25¢
3 in. x 3 16 in. and ¼ in.	2.30¢
1½ to 2½ in. x ¼ in.	2.10¢
1½ to 2¾ in. x 3-16 in. and thicker	2.05¢
1 to 1¼ in. x 3-16 in.	2.10¢
1 to 1¼ x ⅛ in.	2.15¢
⅝ x ⅛ in.	2.30¢
¾ x ⅛ in.	2.40¢
⅝ x ¼ in.	3.45¢
½ x 3-32 in.	3.95¢

Tees:

1 in	2.40¢
1¼ in.	2.20¢
1½ to 2½ in.	2.10¢
3 in. and larger	2.35¢
Beams	2.25¢
Channels, 3 in. and larger	2.25¢
Bands—1½ to 6 x 3-16 to No. 8	2.25¢
"Burden's Best" Iron, base price	3.15¢
Burden's "H. B. & S." Iron, base price	2.95¢
"Ulster"	3.10¢
Norway Bars	3.30¢

Merchant Steel from Store—

	per ℔
Bessemer Machinery	1.90¢
Toe Calk, Tire and Sleigh Shoe	2.50@3.00¢
Best Cast Steel, base price in small lots	7¢

Sheets from Store—

Black

	One Pass, C.R. Soft Steel.	R. G. Cleaned.
No. 14	₩ ℔ 2.50	2.90¢
Nos. 18 to 21	₩ ℔ 2.95	3.10¢
No. 27	₩ ℔ 3.15	3.40¢
No. 28	₩ ℔ 3.20	3.50¢

Russia, Planished, &c.

Genuine Russia, according to assortment, W. Dewees wood	₩ ℔ 11¾@14½¢
Patent Planished	₩ ℔ A, 10¢; B, 9¢, net.

Galvanized.

Nos. 14 to 16	₩ ℔, 3.15¢
Nos. 22 to 24	₩ ℔, 3.55¢
No. 27	₩ ℔, 4.00¢
No. 28	₩ ℔, 4.25¢

No. 20 and lighter 36 inches wide, 25¢ higher.

Genuine Iron Sheets—Galvanized.

Nos. 22 and 24	₩ ℔ 5.50¢
No. 26	₩ ℔ 6.00¢
No. 28	₩ ℔ 7.25¢

Tin Plates—

American Charcoal Plates (per box.)

"A.A.A." Charcoal: IC, 14 x 20	$6.40
IX, 14 x 20	7.65
A. Charcoal: IC, 14 x 20	$5.45
IX, 14 x 20	6.55

American Coke Plates—Bessemer-

IC, 14 x 20, 107 ℔	$4.45
IX, 14 x 20	5.45

American Terne Plates—

IC, 20 x 28 with an 8 lb. coating	$8 60
IX, 20 x 28 with an 8 lb. coating	10.60

Seamless Brass Tubes—

List December 4, 1905. Base price 18¢

Brass Tubes, Iron Pipe Sizes—

List December 4, 1905. Base price 18¢

Copper Tubes—

List December 4, 1905. Base price 21¢

Brazed Brass Tubes—

List August 1, 1908. 21¾¢ ₩ ℔

High Brass Rods—

List August 1, 1903. 15½¢ ₩ ℔

Roll and Sheet Brass—

List August 1, 1903. 15½¢ ₩ ℔

METALS—

Tin—

Straits Pig	₩ ℔ 32 @32½¢

Copper—

Lake Ingot	₩ ℔ 14 @14¼¢
Electrolytic	₩ ℔ 14 @14¼¢
Casting	₩ ℔ 13½@13¾¢
Sheet Copper Hot Rolled, 16 oz	₩ ℔ 18 ..¢
" " " 14 "	" " 19 ..¢

Sheet Copper Cold Rolled, 1¢ ₩ ℔ advance over Hot Rolled.
Sheet Copper Polished 20 in. wide and under, 1¢ advance over Cold Rolled.
Sheet Copper Polished over 20 in. wide, 2¢ advance over Cold Rolled.

Bottoms, Pits and Flats	₩ ℔ 21¢ basis

Planished Copper, 1¢ ₩ ℔ more than Polished.

Spelter—

Western	₩ ℔ 5¾@5¾¢

Zinc.

No 9, base, casks, ₩ ℔ 7.50¢ | Open	₩ ℔ 8.00¢

Lead.

American Pig	₩ ℔ 5¼@5¾¢
Bar	₩ ℔ 6¼@6¾¢

Solder.

½ & ½, guaranteed	₩ ℔ 20¾@20¾¢
No. 1	₩ ℔ 17¾@18 ¢
Refined	₩ ℔ 15¾@16 ¢

Prices of Solder indicated by private brand vary according to composition.

Antimony—

Cookson	₩ ℔ ..@10¢
Hallett's	@9½¢
Other Brands	@8½¢

Bismuth—

Per. ℔ $1.90@$2.00

Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), in ingot for remelting:

Small lots	38¢
100-℔ lots	36¢
Rods & Wire	Base Price 38¢
Sheets	Base Price 40¢

Old Metals.

Dealers' Purchasing Prices Paid in New York

	Cents
Copper, Heavy and Wire	₩ ℔ 11.00@11.25¢
Copper, Light and Bottoms	₩ ℔ 11.00@11.50¢
Brass, Heavy	₩ ℔ 8.25@ 8.50¢
Heavy Machine Composition	₩ ℔ 10 25@10.75¢
Clean Brass Turnings	₩ ℔ 7.50@ 8.00¢
Composition Turnings	₩ ℔ 8.50@ 9.00¢
Lead, Heavy	₩ ℔ ....@ 4. 0¢
Tea Lead	₩ ℔ ....@ 3.80¢
Zinc Scrap	₩ ℔ ....@ 3.00¢

THE IRON AGE

The oldest paper in the world devoted to the interests of the Hardware, Iron, Machinery and Metal Trades, and a standard authority on all matters relating to those branches of industry.

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